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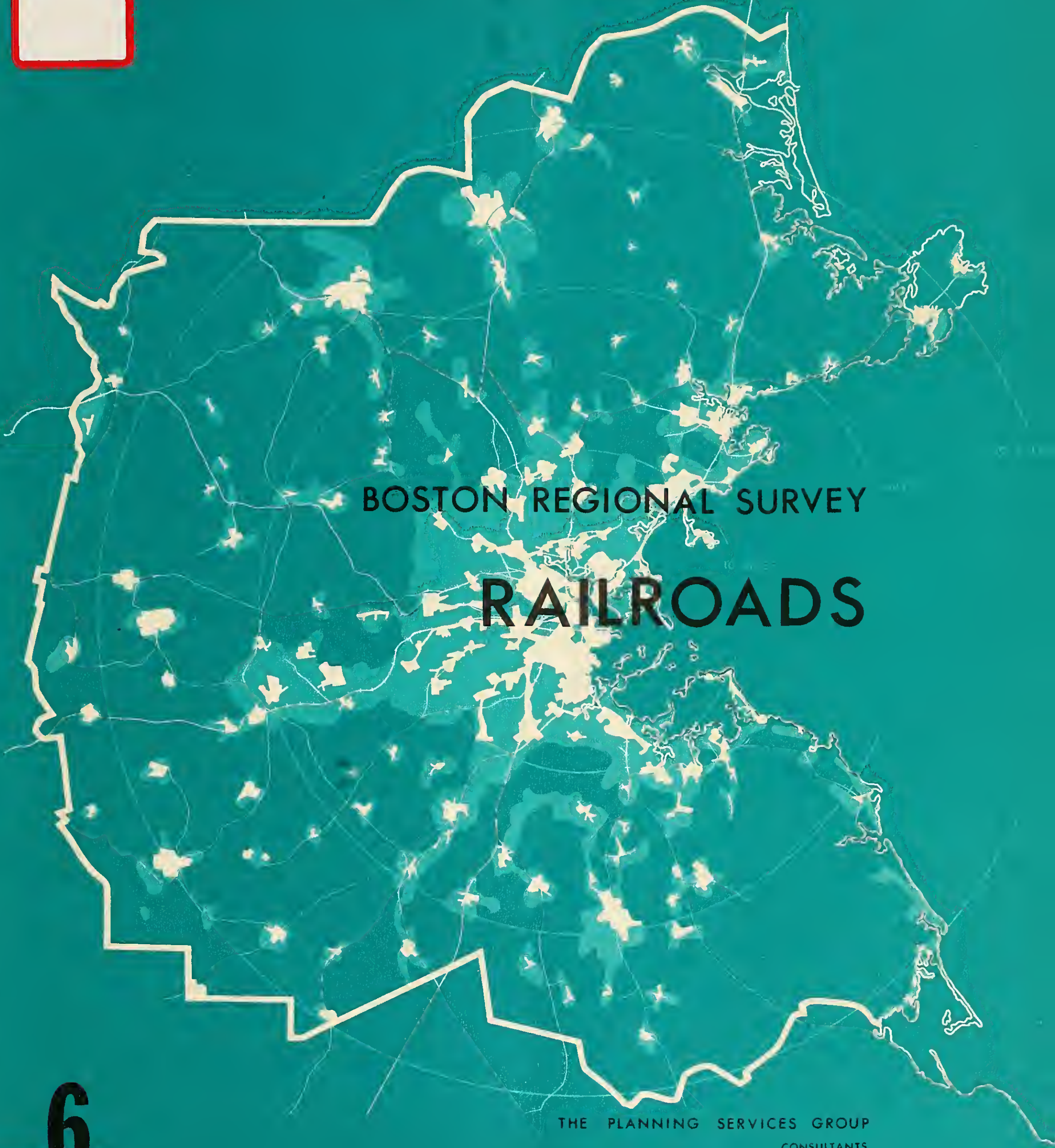

BOSTON REGIONAL SURVEY

RAILROADS

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THE BOSTON REGIONAL SURVEY

TRANSPORTATION INVENTORY: CHAPTER SIX

RAILROADS

AUGUST, 1962

Prepared for the
MASS TRANSPORTATION COMMISSION
COMMONWEALTH OF MASSACHUSETTS
120 Tremont Street
Boston, Massachusetts

by
THE PLANNING SERVICES GROUP
Cambridge, Massachusetts

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THE BOSTON REGIONAL SURVEY

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THE BOSTON REGIONAL SURVEY

INTRODUCTION

In July, 1961 the Mass Transportation Commission initiated a basic planning study of the Boston Metropolitan Region. The objectives of this project, the Boston Regional Survey, are (1) the preparation of a comprehensive inventory of planning studies of the region, and (2) analysis of regional research and proposals with respect to transportation, population, land use patterns, economic development, and other factors.

The Boston Regional Survey is designed as an introduction to the major regional planning and transportation activities in the Boston region recently approved by the Massachusetts General Court and now being organized by the Mass Transportation Commission. These major efforts, in contrast to the present survey, which concentrates on a review and analysis of available reports and data, will involve the gathering of considerable amounts of new information on travel patterns and related phenomena as well as the preparation of comprehensive plans for regional land use and transportation.

Organization of the Survey

The Boston Regional Survey, and the publications resulting from it, have been organized into four main phases:

1. Assembly and summarization of information on all major plans and research studies of the Boston region. This phase culminated in publication of an annotated bibliography in May, 1962. A supplement will be issued upon completion of the Regional Survey containing information acquired subsequently.

2. An overview survey of the foundation elements of regional development. The three chapters in the overview phase include the three inventory topics considered basic in planning: population, land use, and economic base.
3. An inventory of the principal regional transportation systems, to provide an understanding of the ways in which these systems have developed and the prospects for change in each. The four chapters in this phase will cover public transportation, the railroad systems (subject of this report), ports and airports, and the highway system.
4. The final report of the Survey will integrate materials from the three preceding phases into an analysis of regional development prospects, designed to serve as the basis for subsequent planning efforts by the Mass Transportation Commission. Included in the final report of the Survey will be one element of substantial significance to regional development patterns - an analysis of private and community decision factors in the choice of transportation alternatives. This includes an analysis of political, social and economic factors relating to transporation and an evaluation of regional amenities and aesthetics as these relate to choice of transportation modes. Originally cited as Chapter Four: Decision Factors, this material will be included as a part of the final analysis.

The present volume is the railroad portion of the Tranportation Inventory. A listing of all published and planned volumes in the Survey can be found in the front of this report.

The Study Area

The area selected for study in the Boston Regional Survey has been termed the Boston Metropolitan Region. In general this is the area referred to in this report as the "region" or the "Boston region." The location of the area under study is as follows: the area is bounded on the north by the New Hampshire border and on the west it follows roughly a line one tier of communities outside Interstate Route 495, the so-called Outer Belt. In the south, the region borders on the State of Rhode Island and the Southeastern Massachusetts Planning Region (Bristol County) while to the east the waters of Massachusetts Bay define the region.

Scope of this Report

Railroads have had a significant effect upon the urban development of the Boston region. The physical impact of early railroad construction affected key parts of the city of Boston including those areas filled in as a direct result of railroad expansion during the 19th century. The early suburban developments, a majority of them manufacturing clusters, developed along the railroads as they extended radially out of the core.

In recent years with the advent of new forms of transportation such as the automobile and airplane, the financial position of the railroads as well as their effect on the economy of the region have changed drastically. Rail services once considered essential have declined for lack of demand. Large segments of trackage have been abandoned. Passenger service has been discontinued on many lines still used for freight, and there has been a distinct trend in the reduction of passenger service coupled with increases in fares.

Yet despite the consistent decline of passenger volumes in recent years and subsequent reductions in service, there is a realization by

many people in the region that the railroad system occupies an important place in the life and economy of the region. Since abandonment of the rail system would have extremely serious effects, feasible methods of restoring vitality to the region's railroads require careful study.

This report begins with a history of the region's railroad system; the early impact of railroad lines on the economic and physical development of the region as well as some of the significant indirect effects are identified. As a basis for understanding the railroad system and some of its characteristics, a review of the railroad companies that operate in the region follows the historical section.

A chapter on the trends and problems of the railroads highlights the technological gains and shortcomings and the basic competitive position of the rails. National and regional trends are considered as they are affected by business cycles, automobile competition, industrial decentralization, track patterns and other factors. Rolling stock as well as fixed plant problems are considered.

Railroad activity in the region, including long distance, commuter and freight movements are the subject of additional chapters. The commuter situation, characterized in recent years by a strong downward trend in passengers, revenues and profits, is analyzed in detail on a sector basis. This provides an insight into some of the causes and effects of the steady downward trends in commuter passenger volume.

A most important analysis of the region's railroad system examines financial trends and patterns of Boston area railroads. The chapter includes comparisons of regional rail lines with railroads in other parts

of the east coast and the nation. A final chapter deals with several plans and proposals advanced to improve the railroads' financial situation and to make better use of this important regional asset.

1. HISTORY

Introduction

Railroads radiating out from Boston had a profound influence on the core of the central city and the metropolitan pattern of development. In the 19th century, the new railroads not only helped to bring Boston into a closer, more complex relationship with a broader regional hinterland, but also stimulated geographical expansion of Boston into its immediate environs. New suburbs and industrial satellites were established as the railroads improved the accessibility of areas adjacent to Boston. The city expanded in a star-like fashion along railroad rights of way. Formerly isolated towns and villages became way stations on rail lines and developed into more concentrated clusters. Although some of these towns retained their independence from Boston they became part of Boston's immediate hinterland. These events foreshadowed an intraurban function that was soon to develop for railroads: the large scale movements of persons to and from the new suburbs. Important as all these local developments were, however, they were actually unintended and only incidental to the primary motivation behind railroad expansion which was directly related to Boston's inter-regional competitive position.

Railroads and the Internal Structure of the City

Indirect Economic Impact

The railroads enhanced Boston's commercial position as a point for the trans-shipment of goods by allowing commodities coming in and out of the port to be traded over a wider area. Like older cities of the nation, Boston necessarily developed on the seacoast, sustaining itself by trade with outside world over ocean routes. Boston's fine protected harbor was situated at the confluence of several rivers which permitted some access to a small hinterland. Commodities carried in ocean-going vessels were unloaded at Boston and easily trans-shipped inland in shallow draft vessels.

Later, roads and canals supplemented the natural bodies of water and helped extend the hinterland.

A large population settled in Boston at this natural break in lines of transportation to service and facilitate the trans-shipment of goods. Centers of commercial activity, residences, roads were all oriented to the port, huddling close by the waterfront in a dense pattern. Such were the indirect, physical and economic effects of a natural break in transportation which existed before the advent of the railroads.

Direct Physical Impact

The direct physical impact of railroads, however, was of a quite different nature. Whereas the physical linkage between ocean and river, road and dock was relatively simple, the complex technology and the physical characteristics of the fixed railroad right of way made railroad connections more difficult. The problem presented itself in three ways. First, more land, stronger piers and larger storage facilities were needed to accommodate both the restricted radius of curvature of the railroad sidings and the increased goods-handling capacity inherent in the railroad as opposed to carts and wagons. Second, the fixed railroad right of way and long railroad trains were incompatible with complementary modes of transportation, requiring separate rights of way for efficient operation. Separate rights of way at or near the crowded waterfront sections of the city were extremely difficult to obtain.

Third, terminal facilities were space-consuming and needed to be properly located in relation to the commercial activity then centered along the waterfront. While individual rail lines could and did run to their own facilities at waterfront piers, they encountered the difficulties previously discussed. Passenger stations were located at the periphery of the central business district. These stations became the new gateways to the city and

reduced the railroads' close physical orientation to the waterfront.

A new phenomenon peculiar to railroad technology was the requirement of large railroad storage and classification yards. At terminal destination points, trains had to be classified, broken down into cars, reassembled according to whether goods were to be trans-shipped to local market, rerouted to more distant points, or transferred at piers for ocean shipment. Yard operations were a space-consuming, costly operation necessarily located outside the dense business district.

The fourth problem arose from the requirement for a point of transfer among different railroads converging at or near the center of the city. A great portion of the business of individual railroad companies was conducted with other railroads in order to make through connections to places beyond their territory. In addition, private shippers as well as railroads owned terminal piers scattered at various points along the waterfront. Some kind of physical connection establishing points of transfer appeared to be necessary.

Boston: Physical Impact of Railroads

The serious problem the railroads had in adapting to the internal structure of Boston is reflected in the history of railroad construction in relation to the unique topographical characteristics of Boston proper. Originally Boston was located on a small, hilly peninsula connected to the mainland by a narrow isthmus. Other peninsulas nearby jutted into the harbor. The entire basin shoreline was indented with bays, coves and inlets. Boston's waterfront was already built up with wharves constructed during an era of active ocean commerce prior to the coming of railroads. Dense commercial and residential areas concentrated around the waterfront, crowding and impinging upon its port-oriented activities.

Waterfront facilities, already obsolete by railroad standards, were crowded and inadequate for transferring and storing cargoes. Under these conditions, Boston provided space for railroad extensions, yards, depots and warehouses (as well as for commercial and residential uses) by leveling hills and filling in coves, bays and inlets. Figure 1 shows the physical impact of railroads on central Boston.

Four railroads approached Boston from the south and west, all terminating in the general vicinity of South Cove. Two lines, one from Worcester in the west and the other from Providence in the south, crossed an artificial basin in the area to the west of Boston between Brookline and the city proper. Two other lines, the Old Colony from Plymouth and the so-called Midland or Boston-New York Central route entered Boston via South Boston bridging parts of the South Bay and also, in the case of the latter, Boston Harbor.

From a point in Brookline, the Boston and Worcester ran on embankment fill diagonally across the basin in a northwest-southeast direction to Castle Street and then to its passenger station near the present South Station. A subsidiary of this railroad filled in the South Cove area of Boston to build a wharf and terminal facilities on the land. From Roxbury, the Boston and Providence railroad cut diagonally across the basin from the southwest to the northeast proceeding to its passenger station in the Park Square area of Boston. This line intersected the Boston and Worcester at a point in mid-basin near what is now Back Bay Station. The intersection of the two lines gave impetus for the filling and subsequent development of all the surrounding basin area into what is now called Back Bay.[1] The Old

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[1] Walter Muir Whitehill, Boston - A Topographical History (Cambridge: Harvard University Press, 1959), pp. 95-106.

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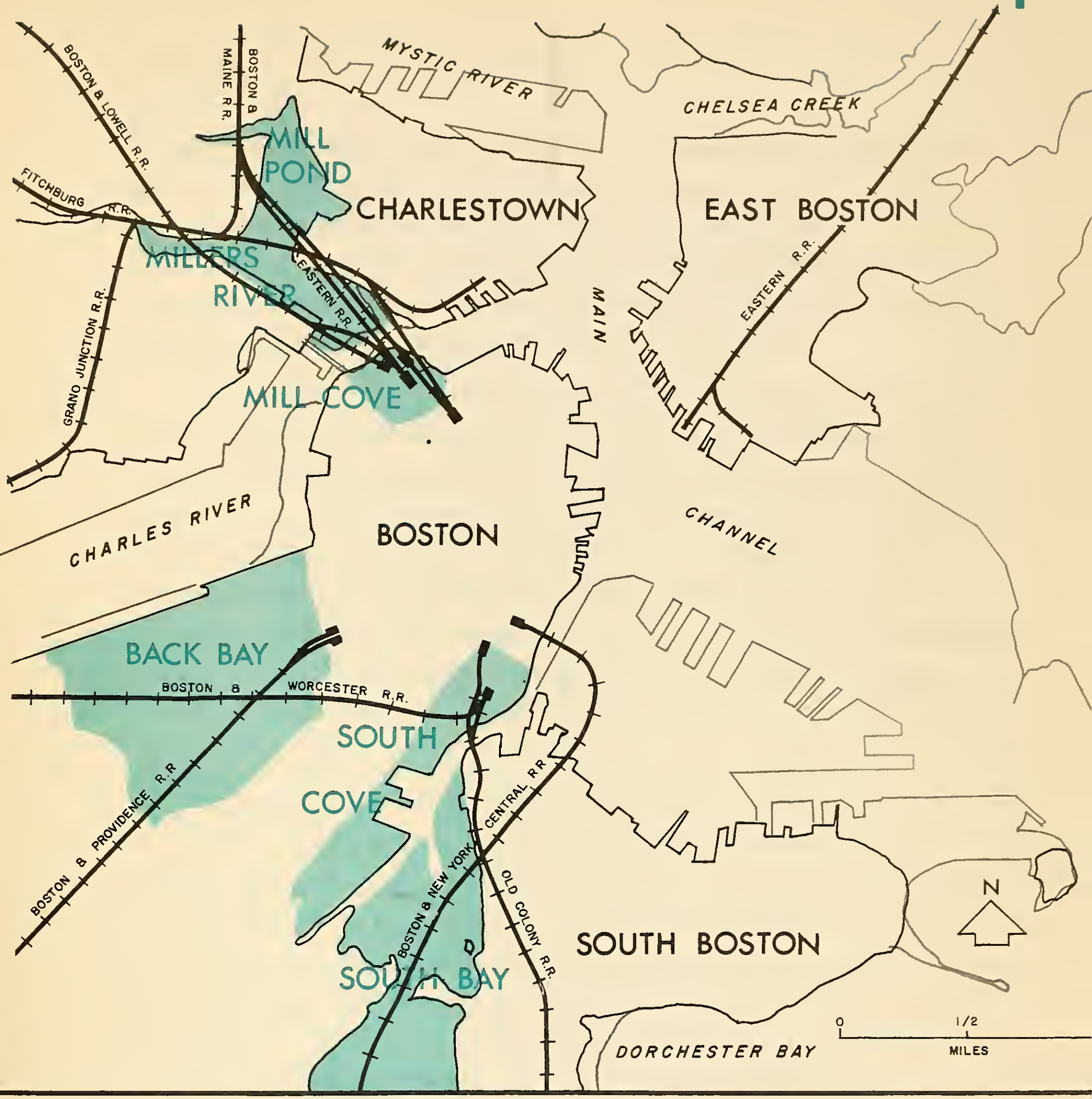

RAILROADS AND LAND DEVELOPMENT IN BOSTON AND ADJACENT CITIES, 1855

RAILROADS

SHORELINE 1855

PRESENT SHORELINE

🟩 RAILROAD ORIENTED LAND FILL AREAS

SOURCE: THE COLTON MAP OF BOSTON AND ADJACENT CITIES, 1855, THE BOSTON ATHENAEUM

Colony crossed the narrow South Bay channel between South Boston and the city proper, terminating in the Boston and Worcester station and later in a separate terminal on nearby Kneeland Street. The Midland route, from a point in Dorchester, traversed a long portion of South Boston Bay before it crossed South Boston parallel to B Street and entered Boston via Boston Harbor at its terminal in Broad Street near South Station.

Four lines running from Lowell, Fitchburg, Salem and Lawrence entered Boston from the north, terminating in the area of Causeway Street north of the business district on land created by filling in Mill Cove. All four lines crossed the narrow Charles River channel separating Boston from Charlestown on parallel bridges. In addition three of the four had to bridge Mill Pond in Charlestown. Only the line originating in Lowell avoided a second water crossing in Charlestown. It approached Boston from Somerville and East Cambridge and made the most westerly crossing, bridging the Charles River proper before terminating in the Causeway Street area.

The Boston and Maine had its passenger station in Haymarket Square but because rail lines were forbidden on city streets beyond Causeway Street, cars were drawn by horses to the station. The Fitchburg line had an elaborate station nearby with a large hall for conventions and concerts. The Boston and Maine and the Fitchburg line had by the late 1800's secured terminal facilities in Charlestown away from the crowded city of Boston. Although the new Charlestown waterfront facilities of these lines were also congested, short spurs provided access to other docks and areas with potential for expansion. The rail line running along the northeast coast to Salem and Maine had at first secured terminal facilities on the flats of East Boston where Noddle's Island in Boston Harbor had earlier been connected by fill to the mainland. The location was unfortunate since both

passengers and freight had to be discharged and transferred by ferry to reach the business section of Boston. Years later the line bought costly land in Charlestown for larger terminal facilities in anticipation of heavy traffic from Maine that was never realized.[1] Finally, the line was able to reroute its track by an indirect route through Chelsea, Everett, Somerville and Charlestown to a station on Causeway Street.

By the middle of the 19th century, eight separate lines had established terminals in Boston. The lines approaching Boston from the south had passenger facilities in the vicinity of South Cove; those approaching from the north terminated in the vicinity of Causeway Street. Thus, it was only natural that the lines to the north of Boston under the Boston and Maine system and the lines to the south of Boston under the New York, New Haven and Hartford and Boston and Albany systems should be incorporated into two terminals north and south of Boston. To the north, the filling of Mill Pond in Charlestown and Miller's River in Somerville provided land for the extensive yards of the Boston and Maine at the junction of Cambridge, Somerville, Boston and Charlestown. To the south, the filled land of South Cove and South Bay provided land near the terminal for the yards of the New Haven system. To the west, the filled land of Back Bay provided space for yards of the Boston and Albany to be used in conuunction with the New Haven. Some lines acquired land for yards further out in the suburban portion of the metropolitan area. The Boston and Albany had yards on the banks of the Charles in Allston; the New Haven obtained yards at Readville on the Boston-Dedham line servicing lines running south and southwest of Boston.

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1. Edward Chase Kirkland, Men, Cities and Transportation - A Study in New England History, 1820-1900 (Cambridge: Harvard University Press, 1948), pp. 195-199.

Summary: Economic Effects

Because of the numerous coves, bays and estuaries surrounding the city of Boston, considerable expense and filling of land was required to obtain land for the necessary railroad connections and terminal facilities in the city proper. Topographical difficulties and the shortage of land resulted in devious rail connections, scattered waterfront terminal facilities or yards and a number of separate passenger terminal locations in and around the congested portions of the city. These conditions made through connections among the many independent railroad lines in the center of the city extremely arduous. Boston possessed only two spur lines, the Grand Junction and Union Freight Railroads, traveling at grade along congested city streets. Consolidation at the center of the city was almost impossible.

Railroads and the Metropolitan Substructure

Early Railroad Construction: A Restricted View

Boston's stature as a center of economic activity depended on the extension of its hinterland and its competitive advantages as a market. Conceptions as to the size of this hinterland or market varied according to two definite stages in the history of New England railroad construction.

In the first stage of railroad construction from 1830 to 1870, a restricted definition of the region was applied. During this period, routes proceeded first to important independent urban centers such as Lowell, Lawrence, Providence, Fitchburg, Fall River and Worcester.

The cities were located at more or less regular intervals in all directions more than 15 miles from Boston. At any smaller distance railroads felt the effects of competition from more flexible cart and wagon freight traffic.[1] These urban centers were located at a great enough distance from Boston to be independent and exert a dominant influence in their adjacent areas. They had sufficient population and industry to justify a profitable exchange of people and goods with the larger market of Boston. When direct railroad connections to Boston were constructed these centers relinquished some of their independence and became satellite communities in Boston's hinterland. The energies of early railroad entrepreneurs were concentrated on developing and exploiting the traffic potential that already existed between these cities and Boston. Traffic potential beyond these cities was not yet considered capable of profitable exploitation.

Growth of Suburbs and Satellites

Early railroad lines to Lowell, Worcester and Providence formed the basic network for the metropolitan railroad system. The industrial activity of the fast developing textile city of Lowell provided the motivation for a rail connection with Boston. Trade between Lowell and Boston had already received impetus from the construction of the Middlesex Canal but because of severe New England winters canal trade was seasonal. The rail line to Lowell traversed the Somerville and Medford areas adjacent to Boston facilitating growth of the suburbs to the north.

The growing industrial activity of southeastern Massachusetts and Rhode Island was a stimulus for a rail extension from Boston to Providence.

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[1] Kirkland, *op. cit.*, p. 202.

There was hope that such a connection would make Boston more competitive with the active steamboat trade in Long Island Sound running from New York to Providence.[1] The line running directly south from Boston provided for a spillover of population into what are now the Roxbury, Hyde Park and Forest Hills sections of Boston. Higher income suburban estates clustered around the more distant stations in Needham and Westwood.

Heavy traffic in wagons and stagecoaches indicated the existence of a substantial traffic potential between Boston and Worcester and intermediate points. The natural barrier created by the Charles River prevented the immediate expansion of Boston to the west and in consequence independent towns and satellites developed at more distant railroad stations in the Newtons, Framingham and Natick.

Other extensions radiated from Boston in the early period of railroad construction. The Old Colony Route was constructed southeast of Boston along the coast to Plymouth and Cape Cod. After it was in operation for two years, the following comments were made about its effects:

> ...The business of transporting merchandise and passengers has been constantly increasing....Not only does it accommodate the people on the whole line, but has the effect of bringing into use lands that would have otherwise remained of little value, and which now have been changed into thriving villages, with healthful indications of a rapid augmentation of property and population. Persons have their family residences at various distances from Boston, and yet conduct their daily operations in town. Such is the rapidity of travel... that a residence 10-20 miles from his place of business is conducive both to health and pleasure....[2]

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[1] Kirkland, op. cit., pp. 111-117.

[2] Boston Almanac (Boston: Thomas Groom, Inc., 1847), p. 160.

The reason for the Old Colony extension is not entirely clear since the southeastern coastal communities were already engaged in active water commerce with Boston. Although shoe and iron manufacturers situated south of Boston did give some promise of potential traffic, the ultimate location of the route near the coast actually bypassed important shoe centers located further inland.[1] The route accelerated the expansion of the inner suburbs of South Boston and Dorchester and further out enhanced the development of the industrial satellite of Quincy and the suburbs of Braintree and Weymouth.

Fitchburg and the towns northwest of Boston, dissatisfied with service from branch lines, wanted a direct connection with Boston. With the prospect of a Hoosac tunnel in northwestern Massachusetts these towns were convinced that they were located on a direct line approach from Boston to the tunnel connecting with the "West." Important raw materials -- granite, minerals and timber -- which abounded around Fitchburg could supplement depleted supplies in other areas and find a ready market in Boston. The completion of the Fitchburg line paved the way for the growth of the inner suburbs of North Cambridge and Belmont and the development of the textile manufacturing satellite of Waltham.

A direct rail connection from Boston to Lawrence was achieved in 1848, the only earlier connection being a branch of the Lowell line. Lawrence, like Lowell, was fast developing as a textile center. Through a policy of low fares, this railroad was successful in fostering dense suburban development in Malden and Melrose to the north. By 1855, the line had the highest passenger volume of any railroad in New England and

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[1] Kirkland, op. cit., pp. 111-117.

at times this volume was higher than any other railroad in the nation.[1]

Another railroad line was extended north along the coast from East Boston through Revere to the thriving industrial areas of Lynn and Salem. Because of their proximity to Boston these cities were already well served by a turnpike and frequent coastal water sailing, thus, the railroad could not effectively compete for freight and passenger traffic with other modes of transportation.

Two other rail extensions were made southwest of Boston, at first ostensibly to tap local traffic but eventually with the primary aim of providing a direct rail route to New York City. The Midland route, traveling jointly with the Old Colony route from South Station through South Boston branched off to the southwest, opening up west Dorchester and Hyde Park for a dense suburban settlement and at the same time facilitating clusters of development in the more distant and wealthier suburbs of Dedham and Norwood. The other southwest route was formed by a branch route through West Roxbury connecting at Needham with the Woonsocket rail line through Dover to Bellingham .

Railroads and the Regional Context

Second Era of Railroad Construction: A Broad View

During the second stage of railroad construction from 1870-1900, the regional influence of Boston extended over a larger area. Construction of new railroad lines and end-to-end consolidation of existing railroads beyond Boston's hinterland satellite cities implemented this policy. Boston was seen in a national context competing with such port cities as New York, Philadelphia and Baltimore. Boston's sector satellite cities were only

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1. Kirkland, *op. cit.*, p. 201.

considered as "gateways" beyond which Boston's hinterland could extend to New York City, the West, northern New England and Canada.

Connections with Other Regions

Boston sought connections with New York City for several reasons: New York was the largest center of population in proximity to Boston and a large reciprocal traffic was developed and sustained as each city provided a market for the other's commodities. During this period the two leading seaports were competitors for marketing and distributing goods from the rich hinterland in the nation's interior. Second, as New York's dominance as the nation's commercial metropolis became well established, commercial transactions between the two cities were more frequent and New York became an increasingly important market for Boston's goods. Third, New York became a natural gateway through which Boston's goods could find a market in the West.

Three possible routes were exploited as through routes from Boston to New York City. One was a coastal route from Boston through southeastern Massachusetts, Providence and along the southern coast of Connecticut to New York City. This route, formerly part of the Old Colony and Boston and Providence systems is now the main line of the Providence Division of the New Haven rail system. A second route, the so-called direct "air-line" route, southwest from Boston ran diagonally across central Connecticut via Hartford, Willimantic, Middletown to New Haven and then to New York City. Today this route exists as the Midland line of the New York, New Haven and Hartford railroad. The third route extended westward through Worcester and Springfield then south through New Haven to New York City. Today the portion of the route to the west is part of the Boston and Albany system while the remaining portion of the route to the south is part of the New Haven railroad system.

Early in the railroad building era Boston tried to establish a direct connection to the West independent of New York City but was confronted with several serious obstacles. First, Boston was physically more distant from the fast-developing West. Second, two ranges of hills between Boston and the Massachusetts-New York border made any such connections expensive and less efficient than comparable connections from other major port cities on the coast. Third, unlike Philadelphia, New York and Baltimore, any connection to the West from Boston had to cross into another state. The other states, with competitive cities of their own, could hinder any such connection to the West. In addition, any line from Boston to the West could be easily tapped by branch connections to New York City.

Two comparatively direct routes were used for connections from Boston to the West. One proceeded west from Boston through Worcester, Springfield, over the Berkshires to Pittsfield and Albany and is essentially the Boston and Albany railroad line as it exists today. Another proceeded up the Nashoba Valley northwest of Boston through Fitchburg, Greenfield, up the Deerfield River valley through the Hoosac Tunnel to New York State. The Fitchburg Division, as the route is currently called, constitutes one of the most important lines in the Boston and Maine system.

Boston attempted to construct more indirect routes to the West with the secondary objective of tapping the northern New England and Canadian markets. But because these lines were longer and less efficient routes to the West, Boston could not compete with New York's Hudson River Valley route as a direct route to Canada nor did sufficient development occur in Vermont and upstate New Hampshire to provide a hinterland with profitable traffic potential.

The three indirect routes to the West are today a part of the Boston and Maine system and other connecting northern New England railroads.

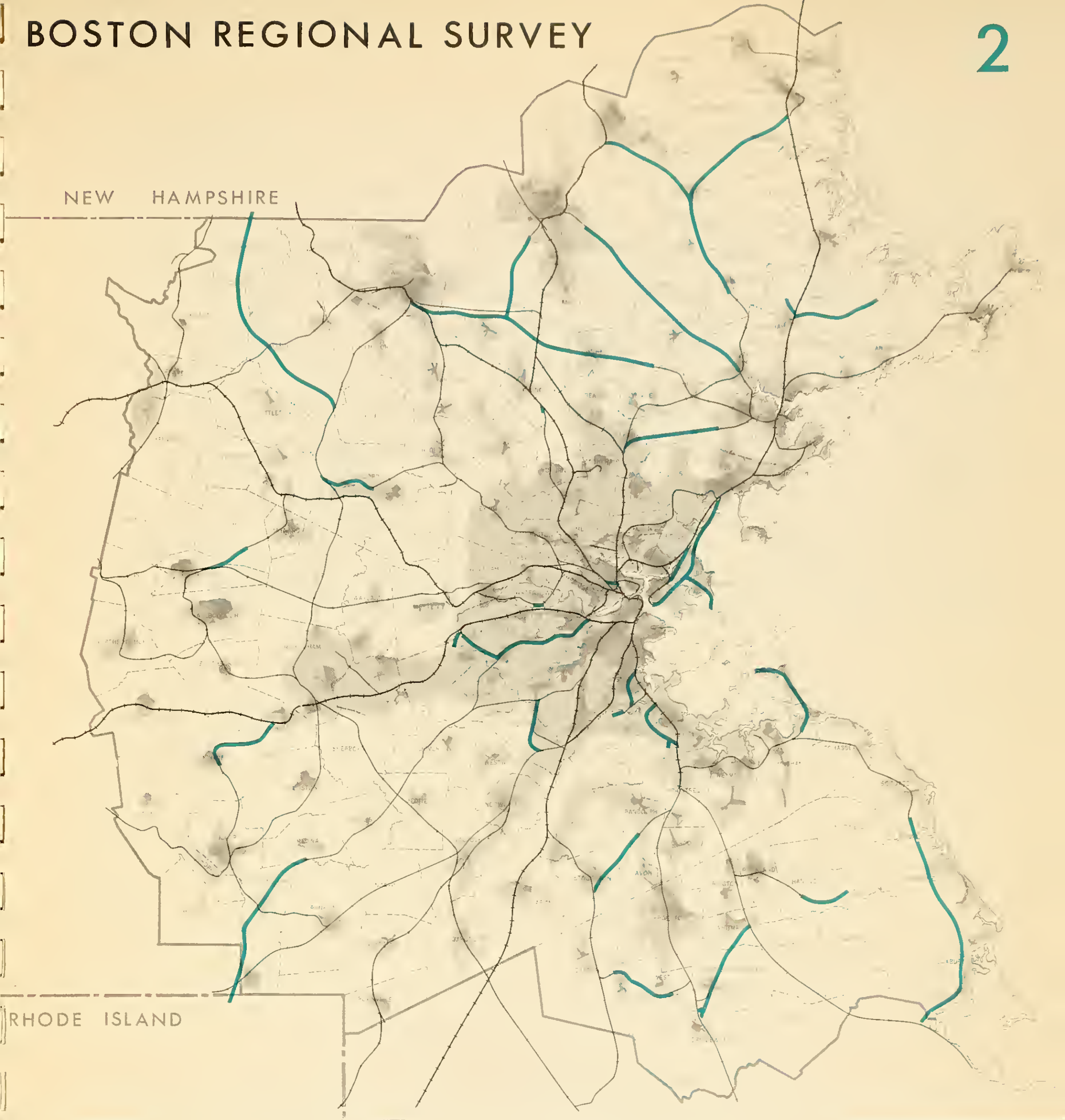
The first route extends from Boston to Fitchburg, through the eastern hills of Vermont to Bellows Falls on the Connecticut River,across the Green Mountains to the Vermont and Champlain Valleys with connections north and west via the Champlain gateway. A second extends from Boston to Lowell up the Merrimack Valley to Concord, New Hampshire, then through White River Junction on the Connecticut River over the Green Mountains into the Champlain Valley with branches to Montreal and northern Lake Champlain. A third route extended from Boston to Concord and Plymouth, New Hampshire, over the White Mountains to Wells River, Vermont, and then into northern Vermont through St. Johnsbury to connect with Montreal and the West.

The hinterland in Maine and southern New Hampshire had always been more properly the domain of Boston. The geographical location of this region relative to Boston assured her commercial dominance, unencumbered by competition from other large metropolitan centers. Furthermore, topography favored a direct, relatively inexpensive and more efficient route. The direct route from Boston to Maine followed the coastline north of Boston extending through Salem, Newburyport and Portsmouth, New Hampshire, to Portland and Bangor. This comprises today the main line of the Eastern Division of the Boston and Maine, although through service to Portland is maintained via another route.

The region's existing railroad network was largely constructed prior to 1850. From 1840 to 1880 there were numerous railroad consolidations as various companies sought to expand their service areas and obtain new through routes. By 1900 two large systems served the Boston region: the Boston and Maine and the New York, New Haven and Hartford railroad. Figure 2 shows the extent of the regional railroad network in 1887 and the changes that have since occurred. With the merger of this diffuse and

BOSTON REGIONAL SURVEY

2



RAILWAY TRACK, 1887 AND 1960

- ━━ TRACK REMOVED SINCE 1887
- ─┼─┼─ TRACK EXISTING, 1960

- ▨ 1885 URBAN DEVELOPMENT
- ▨ 1960 " "

SOURCE: USGS MAP 1887, RAILROAD TIMETABLES

PREPARED FOR THE MASS TRANSPORTATION COMMISSION

BY THE PLANNING SERVICES GROUP, CONSULTANTS

GENERAL INFORMATION

- ☐ EXPRESSWAYS
  - UNDER CONSTRUCTION
  - PROPOSED
- ☐ MAJOR HIGHWAYS
- ☐ SECONDARY HIGHWAYS
- ☐ MAJOR RAILROADS
- ☐ SECONDARY RAILROADS
- ☐ RAPID TRANSIT LINES

▲ SYMBOL APPEARS ONLY WHEN LISTED ITEM IS SHOWN ON MAP

NORTH

2560 ACRES

1

SQUARE MILES

0 5 10 MILES

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FINANCE AGENCY UNDER THE PROVISIONS OF SECTION 701 OF THE HOUSING
OF 1954, AS AMENDED.

complicated rail network into two systems, many lines, formerly important as main line routes of independent railroad companies, have become subordinate in function as the larger railroads chose the most efficient routing patterns from numerous available alternatives. In addition, branch lines that were formerly important competitive adjuncts to independent companies serving the region were viewed as unnecessary duplicating lines under consolidated ownership. During the first half of the twentieth century, the large railroad companies therefore addressed themselves to the task of reducing excess capacity and, as Figure 2 shows, many lines have since been abandoned. The next section will show how the railroads have evolved under changing conditions to meet present economic realities.

Three major railroads serve the Boston region. The Boston and Maine operates in the areas north, northwest and northeast of Boston and serves all of New Hampshire and Maine. The areas south, and southeast of Boston are served by the New York, New Haven and Hartford Railroad while the area west of Boston, between the New Haven and Boston Maine railroads, is served by the Boston and Albany, a division of the New York Central Railroad. Each system is composed of main lines and numerous branches.

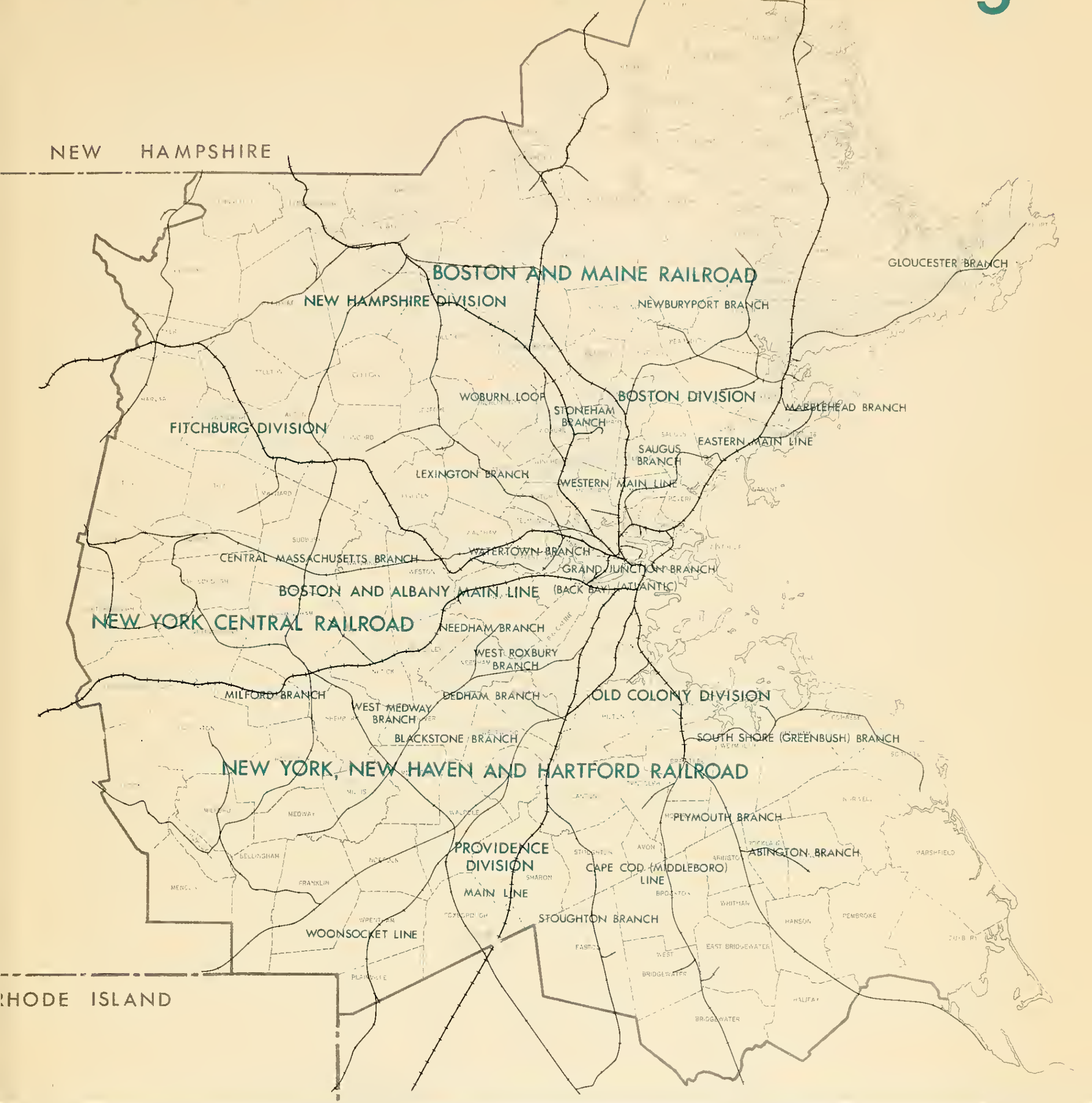
The descriptive text that follows is presented in conjunction with two illustrations which explain and clarify the organizational, operational and geographical features of the rail system in the Boston region. Figure 3 graphically portrays the railroad network showing the ownership of the various systems, the names of the major operating divisions and the names of the main and branch lines. Figure 4 shows the type of service provided on the various lines and identifies those portions of track where service has been discontinued. The following description is provided to supplement the two figures since the complex interlacing of main and branch lines of the rail network in the Boston region give rise to many operational and organizational combinations that are not readily apparent on the map.

The rail network and facilities in or near central Boston which are particularly intricate and complex are portrayed on a separate map at a larger scale. (See Figure 5 .)

The New York, New Haven and Hartford Railroad makes a direct freight connection with the Boston and Albany line over the passenger car tracks at South Station. Two rail line spurs in Boston function as links between the lines of independent railroad systems. (See Figure 5 .) The Grand Junction branch of the Boston and Albany runs from the Boston and

BOSTON REGIONAL SURVEY

3



RAILROAD COMPANIES AND OPERATING DIVISIONS, 1960

SOURCE: RAILROAD ROUTE MAPS AND TIMETABLES

GENERAL INFORMATION

- ▭ EXPRESSWAYS
  - UNDER CONSTRUCTION
  - PROPOSED
- ▭ MAJOR HIGHWAYS
- ▭ SECONDARY HIGHWAYS
- ┼┼┼ MAJOR RAILROADS
- ─┼─ SECONDARY RAILROADS
- ▭ RAPID TRANSIT LINES

▲ SYMBOL APPEARS ONLY WHEN LISTED ITEM IS SHOWN ON MAP

NORTH

1 2560 ACRES

SQUARE MILES

0 5 10 MILES

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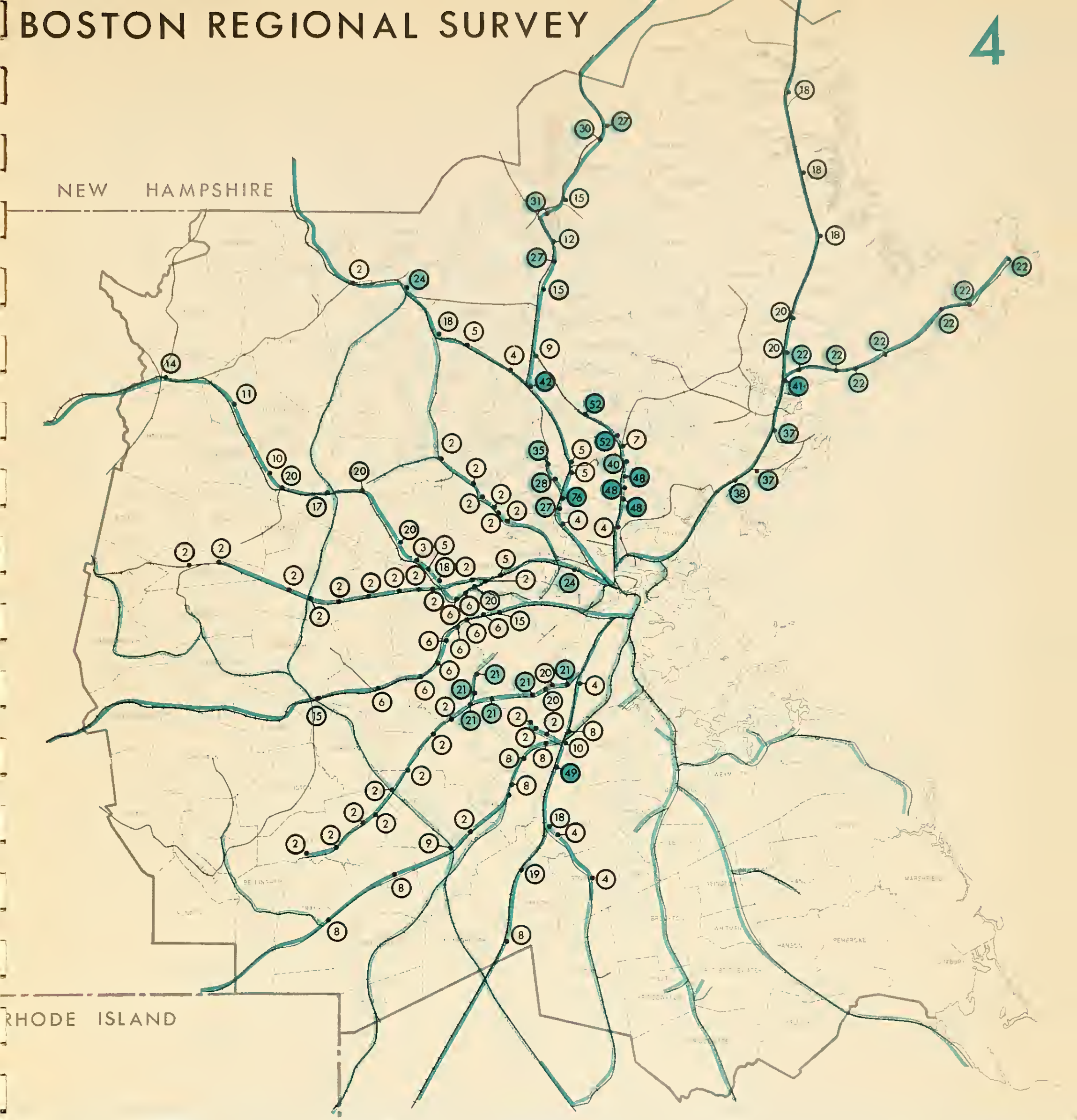
BOSTON REGIONAL SURVEY



TRACK CLASSIFICATION AND PASSENGER SERVICE, 1960

TRACK

- FREIGHT SERVICE ONLY
- PASSENGER AND FREIGHT SERVICE
- SERVICE DISCONTINUED

PASSENGER STATIONS

- ○ UNDER 10 STOPS PER WEEK
- ○ 11-20 STOPS PER WEEK
- ● 21-40 STOPS PER WEEK
- ● OVER 40 STOPS PER WEEK

SCOURCE: RAILWAY TIMETABLES

GENERAL INFORMATION

- EXPRESSWAYS
  - UNDER CONSTRUCTION
  - PROPOSED
- MAJOR HIGHWAYS
- SECONDARY HIGHWAYS
- MAJOR RAILROADS
- SECONDARY RAILROADS
- RAPID TRANSIT LINES

NORTH

2560 ACRES
1
SQUARE MILES

0 5 10 MILES

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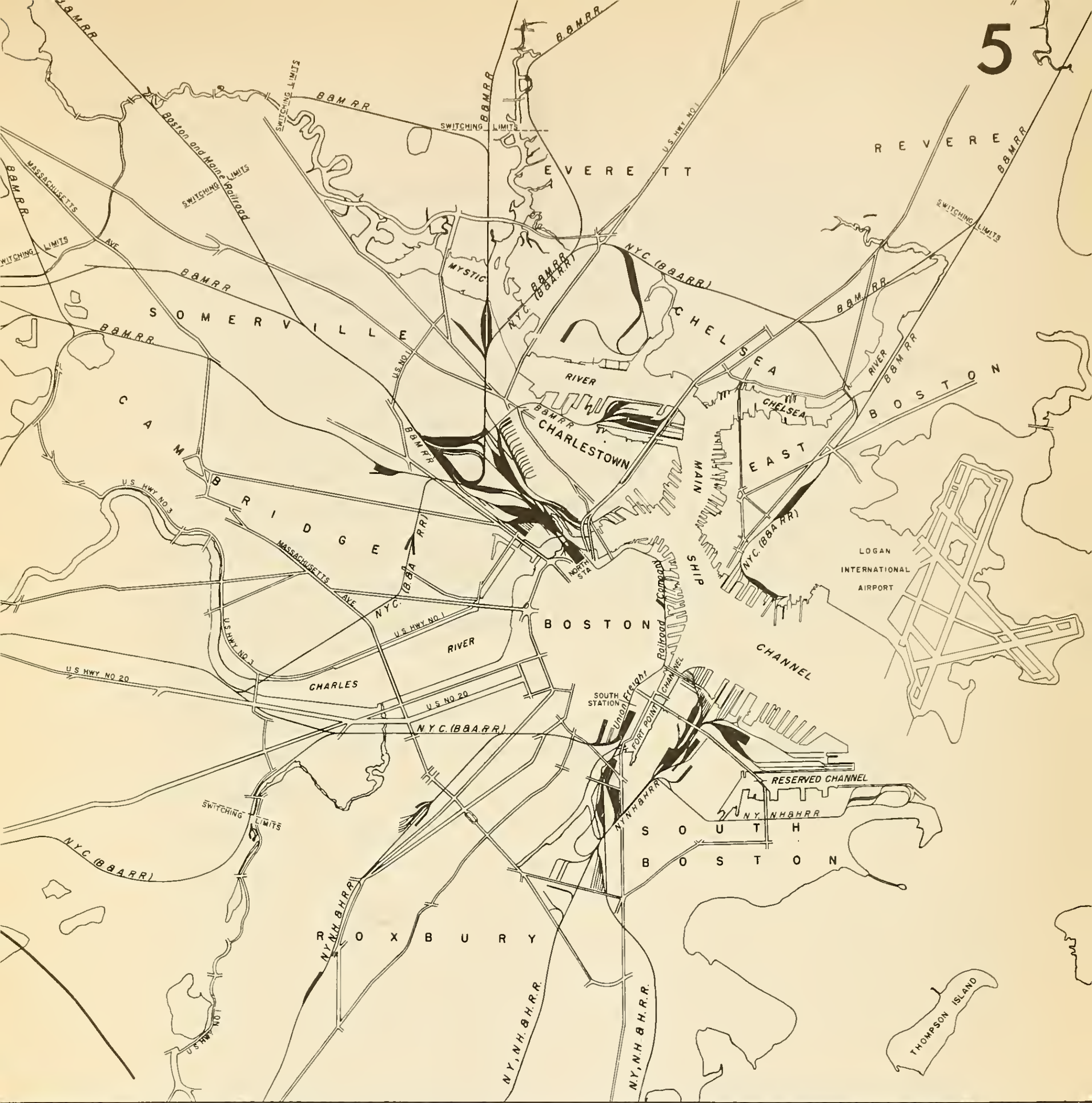

RAILROAD NETWORK IN REGIONAL CENTER, 1960

B.&M.R.R. – BOSTON AND MAINE RAILROAD COMPANY
N.Y.C.(B.&A.R.R.) – NEW YORK CENTRAL (BOSTON AND ALBANY RAILROAD)
N.Y.N.H.&H.R.R. – NEW YORK, NEW HAVEN AND HARTFORD RAILROAD
U.F.R.R. – UNION FREIGHT RAILROAD COMPANY

SOURCE: U.S. ARMY CORPS OF ENGINEERS

NORTH

1/4 SQUARE MILE

0 1/2 1 2
MILES

PREPARED FOR THE MASS TRANSPORTATION COMMISSION
BY THE PLANNING SERVICES GROUP, CONSULTANTS

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Albany yards in Allston across the Charles River through Cambridge and makes a freight connection with the Boston and Maine System at the East Somerville Yards. The branch line then continues through Everett and Chelsea to Boston and Albany docks on the East Boston waterfront. The New Haven's spur line, the Union Freight Railroad runs at grade along Atlantic Avenue to connect North and South Stations, establishing a freight connection between the New Haven and Boston and Maine Systems.

New York, New Haven and Hartford Railroad

The New York, New Haven and Hartford Railroad system terminates at South Station in Dewey Square, Boston, via two main routes: one route travels to South Station via Back Bay carrying primarily passengers; the other route travels along the Atlantic coast mainly carrying freight. (See Figure 4.)

Back Bay Route

The Back Bay line leaves South Station in a westerly direction as far as Back Bay Station, travels in a southwesterly direction through Forest Hills and Hyde Park before connecting with a series of small branch lines and the main line of the New Haven's Providence Division. The first branch from the Back Bay route, the West Roxbury branch, proceeds in a southwesterly direction through West Roxbury and Roslindale, splitting further into two branch lines that provide freight and commuter passenger service; the Needham branch proceeds north to Needham Heights (a total of 14 miles from the main line); and the other branch proceeds 26 miles to the southwest to West Medway. The Back Bay line proceeds south to Readville Junction where another short branch leaves the line to provide passenger service to East Dedham. The Back Bay route serves as the gateway to Boston for the New Haven's most important passenger and freight route to Providence and New York, and is more properly called the

main line of the Providence Division. From the Readville yards, the main line to Providence proceeds south through Westwood, Canton and Sharon to connect with Providence and points beyond. The Providence main line has two branches that provide freight and passenger service: the so-called Blackstone line (once the Midland line to New York), branches immediately from the main line at Readville Junction, serving Islington, Norwood, Walpole, Norfolk and Franklin to the southwest; farther south at Canton Junction, 15 miles from Boston, a short branch leaves the main line to serve Canton and Stoughton

Atlantic Route

The Atlantic line as it leaves South Station splits almost immediately in South Boston. One line, once part of the Midland route to New York, is the main freight route in Boston proper. From South Boston this line veers toward the interior in a southwesterly direction, running through the western portions of Dorchester and Hyde Park before crossing the Boston and Providence line at Readville Junction. The other branch of the Atlantic system, the Old Colony Division, travels in a southeasterly direction along the Atlantic Coast toward Quincy and Braintree. At Braintree, the line splits into three branches. The South Shore branch or Greenbush line travels to the southeast along the coast as far as Scituate; the Plymouth branch proceeds by way of Abington and Whitman to Plymouth; the Cape Cod or Middleborough line runs directly south to Brockton and connects to Cape Cod via Middleborough. The Old Colony system provided major commuter passenger service until 1960 when service was discontinued. The system now provides light freight service and passenger service to Cape Cod only during the summer.

Boston and Albany Railroad

This system consists primarily of a single line running west from

Boston through Back Bay, Allston, Brighton, Newton and Wellesley, then crossing the state via Framingham, Worcester, Springfield, Pittsfield to reach its terminus at Albany. One of the branches of the system, the Newton Circuit or Highland Branch, has been sold to the MTA. Another branch at South Framingham runs to Milford. The Boston and Albany shares jointly with the New Haven railroad the passenger station facilities at South Station and Back Bay, and has its own yards along the Charles River in Brighton and in Framingham. The line provides through freight and passenger service from Boston to Worcester, Springfield, Pittsfield and Albany, New York and is thus a main line connecting the region with the West. The line also provides local commuter passenger service for the suburban communities directly west of Boston.

Boston and Maine Railroad

The Boston and Maine Railroad has three principle lines or divisions terminating at North Station on Causeway Street, Boston. The Boston and Maine maintains yards in East Somerville at the junction of Boston and Cambridge and at Greenfield in western Massachusetts.

Fitchburg Division

The main line of the Fitchburg Division runs northwest from Boston crossing the southern part of Somerville, North Cambridge, Belmont; the business section of Waltham, northern portions of Weston through the towns of Lincoln, Concord, Acton, Littleton and Ayer. It continues outside the Boston region to connect with Fitchburg, Greenfield and North Adams before terminating at Troy, New York. This line is the most heavily used freight line entering Boston and offers local passenger service as far as Fitchburg. The Watertown Branch deviates from the Fitchburg line at a point in Cambridge, passing in a southerly direction through the Mt. Auburn section of Cambridge to Watertown in the vicinity of Watertown Square. After a break in the track in Watertown, the rest of the line

proceeds through Waltham to rejoin the Fitchburg main line further west. Light freight service only is provided from either of the two ends of the branch that connect with the main line. Service on the short Maynard branch was discontinued in May, 1958.

The Lexington Branch forks from the main line at a junction in Somerville proceeding through Arlington, Lexington and Bedford. The Lexington Branch is a lightly used freight line and provides a small amount of local passenger service as far as Bedford. The Central Massachusetts line branches from the Lexington Branch at North Cambridge, running west parallel to the Fitchburg main line through Belmont, Waltham to Hudson. Portions of the line beyond Hudson still exist, but have been abandoned.

New Hampshire Division

The New Hampshire Division, formerly called the Southern Division, has always provided passenger service from Boston via Lowell and the New Hampshire Merrimack River communities to White River Junction, Vermont where it connected with the Central Vermont Railroad. Prior to 1958 through freight and passenger service via Lawrence, Haverhill and Dover, New Hampshire, to Portland, Maine, was provided for Boston via the Reading line (or Western line of the Portland Division as it was then called). Since 1959, however, freight and passenger service via Lawrence, Haverhill, Dover, New Hampshire and Portland, Maine has been rerouted to the New Hampshire Division via a short connection at Wilmington Junction. Thus, the New Hampshire Division is the only line of the Boston and Maine system to provide through freight and passenger service. Local passenger service is also provided on this line.

The New Hampshire Division has a complex system of branch lines. The main line runs northwest of Boston through the heart of Somerville, turning north through West Medford, Winchester, Woburn and Wilmington

before reaching Lowell. Three other lines branch directly from the main line. The Woburn Loop leaves the main line at Winchester, paralleling it to the west as it runs north to serve Woburn. The loop which stops just short of rejoining the line further north in Wilmington, provides local passenger service only as far as Woburn Center. The relatively short Stoneham branch leaves the main line in Winchester running directly east to the center of Stoneham. Passenger service was discontinued on this branch in May, 1958. The third branch leaves the main line at Wilmington Junction, traveling directly north for a short distance and connecting the line from Lawrence and Haverhill with the New Hampshire Division's main line. This short spur connection has permitted through freight and passenger service from New Hampshire and Maine to be routed via the New Hampshire Division since 1959.

The Eastern and Western Lines

Two lines, the Eastern and Western, were once known as the Portland Division. But when through freight and passenger service from New Hampshire and Maine was rerouted over the New Hampshire Division, they became more local in function.

The western main line, known as the Reading line, proceeds directly north from East Somerville traveling through Malden, Melrose Melrose, Wakefield and Reading. The portion of the line continuing northwest to connect with the line serving Lawrence and Haverhill was discontinued in June of 1959. The Reading line now handles only freight and local commuter passenger service. The short Medford branch leaves the line a short distance from Boston at Wellington, running directly west to the central portion of Medford. Service was discontinued

on this branch in June, 1959. Farther north, Newburyport Branch leaves the main line at a junction in Wakefield running in a northeast direction through Lynnfield and Peabody. Service on this branch was also discontinued in June, 1959.

The Eastern main line proceeds from East Somerville across the Mystic River into Everett where it bears east through Chelsea. At Chelsea it turns north traveling in a northeast direction along the Atlantic coast through Lynn, Salem and Beverly connecting to Newburyport and Portsmouth, New Hampshire. The Eastern main line provides both freight and passenger service, but since service terminates at Portsmouth, New Hampshire, only a short distance from the Massachusetts border, it can hardly be considered as through service. The line serves Lynn and Beverly, two fairly sizable cities only a short distance from Boston.

The Eastern main line has four branch lines, only one of which is still in operation. The Saugus branch line is actually a loop that starts from a point on the main line in Everett, circles in a northeast direction through Malden, Revere and Saugus before rejoining the main line further north at Lynn. Service was discontinued on this line in May, 1958. Farther north in Salem a short spur line branches east to Marblehead. Service on the Marblehead branch was discontinued in June, 1959. Also in Salem, there is a branch to the west serving Peabody and Danvers on which service was discontinued in May, 1958. The Gloucester Branch leaves the main line in Beverly, running east to serve the Cape Ann areas as far as Rockport. This branch provides both light freight service and commuter passenger service.

3. TRENDS AND PROBLEMS

Introduction

Although railroads provide service for both freight and passenger on the basis of technology, economics and profitability, the transportation of freight is considered the function to which railroads are best adapted.

There are a number of problems in determining the relative profitability of respective railroad functions, primarily because the railroad fixed plant is shared by freight and passenger service. Serious questions have been raised regarding the equity of the ICC method of allocating joint costs among different operational functions, and as a result statements about the revenue- or deficit-producing characteristic of railroad freight or passenger service are frequently regarded with reservation. The ICC system is especially questionable in allocating respective costs when railroads use long and short haul passenger service in addition to freight service on the same track.

Another problem which intimately affects the economics of railroad operation is the institutional framework that governs railroad operations. The state and federal governments view railroads (like utilities) as necessary for the public welfare. Railroads are considered "common carriers" and as such their rates and level of service are regulated by the government in the interest of the public. There is a considerable gap between "institutional necessity" as defined by the government from the point of view of public welfare, and "economic necessity" as defined by railroad corporations from the point of view of net return on operations. For example, railroad overcapacity is partly the result of geographic overextension of routes and branches which must be maintained to provide "necessary" minimum level of service in the public interest. Thus, railroads cannot respond quickly to changing traffic trends nor do they have a freer hand in establishing levels of service and pricing policy.

The Effects of Technology on the Basic Competitive Position of Railroads

Basic advantages of railroads are their large capacity, high speed and long-haul efficiency. However, these advantages are achieved at considerable cost. The very factors that contribute to the effectiveness of railroads also contribute to the railroad's most serious disadvantage: inflexibility. Rail transportation service operates at maximum efficiency when standardized commodities are carried in regulation-sized cars to a national market with regularly scheduled service stops at designated points. The uniformity required by such a system does not permit easy adaptation to individual preferences and needs of customers.

Inflexibility has both technological and economic aspects. Economies of large scale service are achieved through technological specialization. Because of its specialized character, the railroad right-of-way is not readily adaptable to other means of conveyance and customers must either cluster close to the system to obtain direct access or else use other means of transportation. Geographical coverage is therefore limited. Moreover, railroad vehicles, unlike vehicles on water and highway, cannot meet and pass each other on the same track. Limited maneuverability of rolling stock and design restrictions contribute to geographically restricted track patterns. Railroads, unlike other modes of transportation, must assume the expense for construction and maintenance of rights of way and other supporting facilities. Railroad freight customers often bear the expense of construction and maintenance of sidings to obtain direct access to the system; because costs are high, long branch connections are prohibitive for individual customers. Branches are built by the railroad only when a sufficient density of activity exists to sustain profitable service. Thus, activities tend to locate close to the main line of the system.

The specialized nature of railroad transportation originally permitted the use of trains which were able to provide transportation at low cost. But with declining railroad traffic volumes, technological specialization has resulted in continuing high operating and maintenance costs. A large initial investment is required to provide a minimum operational plant which already has high built-in capacity and attendant high maintenance costs. Thus, the level of investment, in contrast to other types of transportation, cannot be geared to the level of service desired. Approximately two thirds of the investment in railroads is used to provide, maintain and operated fixed facilities such as roadways, tracks, yards, signals, repair shops and administrative offices. Operating and maintenance costs on these fixed facilities do not vary with changes in the amount of revenue-producing traffic carried by the system. Only 20 per cent of railroad expenses are variable while 80 per cent are fixed. However, it is important to note that the proportion of railroad expenses which are varialbe depends upon the time span over which these costs are viewed. For example, while a small proportion of costs may be variable daily or weekly, a larger proportion will be variable from year to year, and so on. With a large investment and high fixed charges, railroads have a rigid break-even point. Moreover, this break-even point is often high, requiring a large volume of revenue-producing traffic before revenue will equal or excede costs.

Long-range National Trends

Inflation, cyclical business activity, changes in the structure of industry and industrial decentralization are long-term national trends that have influenced the decline in railroad business in favor of other competitive modes of transportation. Although most of these long-term trends have occurred independently, they have been abetted and accelerated by the inherent technological and economic weaknesses of the railroad in relation to the economies obtainable in other methods of transportation.

Inflation and Business Cycles

The long-term inflationary spiral following World War II has continued almost unabated, causing the price of railroad equipment, materials and wages to rise. The large share that these expenses represent in the railroad cost structure and the fact that they are largely unrelated to the amount of traffic have compounded the problem for railroads, seriously undercutting earnings. Terminal costs, which are largely due to costs of labor, have been especially affected by inflation. Recent cyclical changes in business activity have also had their effects. The railroads never fully recovered from a series of closely spaced, business recessions in 1948-9, 1953-4, and 1957-8.

Industrial Composition

The change in the composition of the nation's industries has more important implications in terms of long term demand for railroad transportation service. Industrial production has become more complex and there has been a corresponding increase in the number of industries producing relatively unstandardized, less bulky and smaller intermediate products. The leading national growth industries, especially plastics, electronics and ordnance, reflect the trend toward compact, lighter materials and products with a high value. Industrial expansion is directed toward manufactured products that are not as economically suited for railroad transportation as they are for truck or other transport.

Industrial Decentralization

Transportation charges have risen more rapidly than other business costs during the last 10 years.[1] This trend has had a definite effect of the location of industrial plants. The single large plant serving a national market has gradually become a thing of the past as industries have decentralized to multiple plants serving sectional or regional markets. The smaller regional market with its characteristics shorter hauls is often more efficiently served by highways than by railroads.

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[1] Benjamin Chinitz, "The Effect of Transportation Forms on Regional Economic Growth", Traffic Quarterly, April, 1960, p.p. 134-136.

Long-range Regional Trends

New England and the Boston region have reflected national trends in regard to inflation and business cycles except for slight differences in timing and intensity. However, the effects of these trends on railroads have had particular impact on the Boston region because of characteristics peculiar to the area.

Economic Growth

Economic stability, slow population growth, plus great increases in the use of private transportation have resulted in an economic squeeze on railroads serving the Boston region.[1] Although other regions have had comparable increases in private transportation they do not show the decline in rail service experienced by New England. One reason for this regional decline is that New England has not been growing as fast as the nation. The national index of industrial productivity increased by almost ten per cent from 1955 to 1959, but in those years the New England index increased only four per cent.[2] Although the Boston region has done somewhat better than the six-state area, the railroads serving the Boston region have been affected by area-wide trends.

Industrial Decentralization

The full impact of industrial decentralization has not been felt in the Boston region. The region is geographically isolated from the central portion of the national market and is at the northern terminus of the huge eastern market from Boston to Washington. Many plants manufacturing heavy goods serving a large sectional market of this type prefer to locate in the most dense center of the urban belt to maximize economies of distribution and avoid costly empty back haul trips.

Automotive Competition

The competitive inroads made by highway transportation on railway business have been particularly intense in the Boston area. The Boston region was an early leader in the development of limited-access intercity

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[1] National Transportation Policy; Preliminary Draft of a Report Prepared for the Committee on Interstate and Foreign Commerce, United States Senate, by the Special Study Group on Transportation Policies in the United States (Washington, D.C., January 3, 1961), p. 353.

[2] Loc. cit.

highways and now has an extensive network of expressways compared to other regions.[1] In the early 1950's Boston constructed the nation's first major limited-access highway (Route 128) around the fringes of the core, providing local impetus for decentralization of industry. A 1957 survey of three quarters of the companies located on Route 128 indicated that only a small number of firms representing about five per cent of the total employment considered freight rail sidings important to their operations.[2]

Since 1957, new patterns of industrial concentration have been established along other major expressways. Most of these industries are strongly oriented toward truck as opposed to rail freight.

Since about 68 per cent of the Route 128 firms were formerly located within 2 1/4 miles of the center of Boston, suburban relocation probably resulted in reduction in rail commuting. Many industries along Route 128 are accessible only by automobile. In addition, they have adequate space for parking facilities, and thus about 95 per cent of their employees drive to work.

Industrial Composition

The Boston region has come to specialize in light industries with unstandarized, high value products, such as electronics equipment, plastics and final stages of metal fabrication. Firms manufacturing these products are most apt to take advantage of the economies inherent in highway transportation. The slower growing paper and paper products, food and cement industries have traditionally been the principal customers of the Boston area railroads. Boston railroads have lost much bulk coal traffic because of the increasing use of petroleum and natural gas for heating New England homes. Although the relative importance of the once large textile industry to the region's railroads is still the subject of debate, there is no

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1. National Transportation Policy, op. cit., p. 353.

2. Alexander Bone, Economic Impact Study of Massachusetts Route 128 Department of Civil and Sanitary Engineering, Massachusetts Institute of Technology, December, 1958, p. 32.

doubt that the declining fortunes of this industry have had negative effects on the Boston region's railroads.[1] A more detailed analysis of the freight composition of the regional railroads follows in a section devoted to analysis of trends in regional freight traffic.

Terminal Charges

Because of the Boston region's dense pattern of urban settlement, its geographical position in relation to the national market and its historical difficulties in obtaining a through route, railroads serving the Boston region are saddled with particularly high terminal costs compared to other railroads in the nation. In this regard, distinction should be made among three basic types of railroad traffic: through, local and terminal. Through traffic on main rail lines over relatively long distances between major urban areas is redistributed over local branch lines in large urban areas becomes terminating traffic when it reaches its final destination. Both local and terminal traffic have a large proportion of expensive terminal operations such as switching, classification and assembly. Because the Boston region is made up of many densely populated metropolitan areas, cities and towns, much of the railroad traffic in the region is comprised of expensive local and terminal traffic. The New Haven's share of local and terminal traffic is larger than the Boston and Maine's share, because the New Haven serves the densely populated areas south and southwest of Boston. The Boston and Maine serves less densely settled areas north and northwest of Boston and connects with other railroad systems originating in northern New England.

Since the Boston region is a manufacturing center and lacks raw materials, large quantities of raw materials must be imported for processing by manufacturing plants and to provide for local consumption. Two factors, local consumption and the conversion of large, bulky shipments of raw materials into manufactured products of smaller size

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[1] Annual Report of the Boston and Maine Railroad, 1956, p.9.

and weight, result in high proportions of terminal traffic and an unbalanced movement of traffic. More goods move into the region than out of the region and a considerable portion of the region's freight cars are hauled out of the region empty.

One indication of the delay and expense associated with the terminal function of the region's railroads is the very high per diem freight charge paid by Boston area railroads. Freight cars of one railroad are consolidated into trains of another railroad in order to make through connections to areas outside the originating railroad's jurisdiction. Reciprocal per diem charges are payed by each railroad for the use of another railroad's freight cars. Once their freight has been discharged freight cars go to terminal yards for further dispatching and assembly and the railroad owning the terminal facility must pay per diem charges for delays or stopovers at terminal facilities.

Length of Haul

The short-haul nature of the region's railroads reflects the large proportion of local and terminal traffic and is a product of the pattern of dense urbanization and overlapping metropolitan areas. The Boston region's present railroad network is therefore a diffuse system of main lines and short branch routes and the main lines of New Haven and Boston and Maine railroads are no more than 250 miles in length. Short hauls make profitable operation difficult for the railroad companies, necessitating higher rates and therefore encouraging the diversion of both passenger and local freight traffic to private and common carrier highway transportation.[1] For example, the number of tons of local freight as well as its percentage share of total traffic has declined sharply since 1929 due to the effectiveness

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[1] "A Railroad Policy for New England", Interim Report No. 7, March, 1957 in Public Transportation for New England, New England Governor's on Transportation, p. 21.

of truck competition for short haul local traffic.[1] Short hauls result in result in high terminal costs and operation at less than maximum efficiency[2] for the region's railroads.

Although the average hauls of the Boston Maine and the New Haven for both passenger and freight are substantially longer than the average for New England, the average hauls for railroads serving Boston and New England are shorter than the average in either the eastern part of the nation or the nation as a whole. The discrepancy between Boston railroads and other districts in length of haul is generally greater for freight than passenger service. There are, however, two exceptions to this general pattern and they both apply to passenger service. The average passenger trip on the New Haven is actually longer than the Eastern District average but still considerably shorter than the national average. In contrast, the average passenger trip on the Boston and Maine is shorter than all other comparable districts. The New Haven still retains some medium-haul interstate passenger service in addition to its commuter service while the Boston Maine's interstate passenger service is quite small compared to its short-haul commuter service. Table 1 also shows that in line with trends on New England railroads and the nation, the average haul for both passenger and freight on Boston railroads is growing longer as unprofitable short hauls drop off. It appears that Boston area railroads are losing less of their short-haul traffic than other New England railroads but more of their short-haul traffic than other Eastern railroads.

Track Pattern

In the early days of railroad construction competition was particularly intense around Boston, leaving as a legacy the problem of excess capacity in numerous branches and roundabout, duplicating routes. The Boston and

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[1] "A Railroad Policy for New England", op. cit., p. 21.

[2] Even though the volume of traffic may be high, the average length of haul may be short resulting in frequent stops and large fuel and running time losses.

TABLE 1

AVERAGE LENGTH OF HAUL, FREIGHT AND PASSENGERS, BOSTON, NEW ENGLAND, EASTERN DISTRICT AND THE NATION, 1929-1959.

	1929 Miles per		1959 Miles per	
	Revenue Ton	Revenue Passenger	Revenue Ton	Revenue Passenger
Boston and Maine	125.84	21.36	173.64	23.68
New Haven	129.23	30.55	151.90	41.86
New England Region	114.28	28.51	142.84	39.26
Eastern District*	151.15	30.43	188.97	40.32
United States	182.46	39.81	250.91	65.23

Source: Interstate Commerce Commission, Statistics of Railways in the United States, 1929, and Transport Statistics in the United States (Bureau of Transport Economics and Statistics, 1960.)

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* The Eastern District includes all railroads east of the Mississippi River and north of the Virginia-North Carolina line.

Maine estimates that at the most only 58 per cent of existing trackage is justifiably maintained:

> 42% of the railroad produces only 2% of the freight business; that 58% of the railroad produces the other 98% of the freight business; and that 27% of the railroad lying between Mechanicville, New York and Boston, between Worcester and Lowell, Mass., and between Lowell, Massachusetts and Portland, Maine, produces 74% of the freight business.[1]

The diffuse track pattern is an even more serious problem with the New Haven railroad. The Interstate Commerce Commission found that one third of New Haven road miles accounted for 80 per cent of the gross freight revenue and that there were 1,200 miles of very light density line.[2] Almost 25 per cent of the New Haven's freight lines produce less than three per cent of its traffic.[3]

Capital Expenditures on Plant and Equipment

In making expenditures on plant and equipment the railroads attacked the problems of reducing overcapacity, increasing efficiency and improving confort and convenience. Continuous capacity use and deferred maintenance of railroad facilities during the period of World War II necessitated heavy capital expenditures on plant and equipment in the late 1940's and early 1950's. In the last few years, however, a distinct decline in capital expenditure has become evident.

Rolling Stock

The railroad movable equipment or rolling stock is the portion of the plant that provides transportation service. Carloads from

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1. Annual Report of the Boston and Maine Railroad, 1956, p. 19

2. Interstate Commerce Commission, "Report on Passenger Fares, New York, New Haven and Hartford Railroad Co., "Docket No. 333332, reported November 21, 1960.

3. Six Month Report of the Trustees of the New York, New Haven and Hartford Railroad Company, March 5, 1961, p.1

individual customers are consolidated into trains hauled by the locomotive. Economies are thus achieved by spreading the costs of tractive power over as many revenue-producing carloads as possible. The total cost of providing power for traction is the same whether the trainload is large or small. On the other hand, the cost per carload is significantly smaller for larger trains than for small trains, stressing the inherent economies of large volume for railroads. Operating costs rise very slowly in proportion to distance traveled making railroads a most efficient carrier for long hauls. Any distance over 150 miles is considered a long haul. The high initial investment for locomotives is justified economically only if the locomotive is utilized for carrying large heavy loads commensurate with its great hauling power. Cars must be sufficiently large and sturdy to accommodate these loads without damage but light enough to insure that locomotive capacity is used to haul revenue-paying loads rather than unproductive dead weight. The initial investment in cars is defrayed by capacity loads and continuous use. Idle standing time means that expensive rolling stock is either excess to the needs of the railroad or not being efficiently utilized.

Locomotives Most of the railroads in the United States, including the three railroads serving the Boston region have converted from steam to diesel-electric locomotives almost completely. (See Tables 2 and 3.) The diesel engine drives an electric generator which acts as a portable power plant. Diesel-electric advantages over steam locomotives are: increased efficiency through diminished fuel losses, increased traction power at lower speeds, and lower maintenance costs. Longer trains with better running times are thus possible. Another advantage of diesel-electric engines is that they can be put into use quickly, without the long preparation time needed for steam locomotives. Table 3 also shows that unlike other suburban railroads which are electrified, Boston has no electric locomotive units in service.

TABLE 2

EQUIPMENT INSTALLED AND RETIRED, BOSTON AND THE NATION, 1950-1959.

Type Equipment	Boston and Maine	New Haven	United States
Locomotives			
Installed	199	410	17,581
Retired	326	571	29,444
Gain or Loss	-127	-161	-12,063
Freight Cars			
Installed	5,244	3,014	528,284
Retired	4,440	3,675	621,249
Gain or Loss	+804	-661	-92,965
Passenger Cars			
Installed	433	570	3,380
Retired	1,378	822	13,796
Gain or Loss	-945	-252	-10,416

Source: Interstate Commerce Commission, *Statistics of Railways in the United States, 1950-1954* and *Transport Statistics in the United States* (Bureau of Transport Economics and Statistics), 1954-1960.

TABLE 3

INVENTORY OF EQUIPMENT IN BOSTON AND OTHER METROPOLITAN AREAS, 1959

	Self-Propelled Equipment			Locomotive-Propelled Trains		Locomotive Units in Service				
	Electric Passenger Cars	Gas-Electric Cars	Diesel-Electric Cars	Single Level Passenger Coaches	Total Passenger Cars	Steam	Electric	Diesel-Electric	Talgo	Total Loco-motive
New York	1566	---	8	1,071	2,654	--	24	203	--	227
Chicago	280	---	--	859	1,139	--	--	133	--	133
Philadelphia	454	4	7	230	695	--	3	52	--	55
BOSTON	----	---	144	294	438	--	--	38	10	48
Cleveland	----	---	---	5	5	--	--	2	--	2

Source: Collapse of Commuter Service, A Survey of Mass Transportation in Five Selected Cities (Washington, D. C., 1959), p. 19.

TABLE 4

SUBURBAN SERVICE EQUIPMENT ACQUISITON IN BOSTON AND OTHER METROPOLITAN AREAS, 1945-1960

Metropolitan Area	Multiple Unit Electric			Rail-Deisel Cars			Coaches			Total		
	1945-1954	1955-1960	Total	1945-1954	1955-1960	Total	1945-1954	1955-1960	Total	1945-1954	1955-1960	Grand Total
New York	330	44	374	8	9	17	16	80	96	354	133	487
Philadelphia	53	6	59	12	-	12	12	-	12	77	6	83
BOSTON	-	-	-	48	96	144	21	5	35	69	101	170
Pittsburgh-Washington	-	-	-	10	6	16	-	-	-	10	6	16
Total	383	50	433	76	111	187	49	85	134	510	246	756

Source: Exhibit of Eastern Railroad Problems, Eastern Railroad Presidents' Conference, October,1961, p.128

Freight Equipment The joint use by all railroads of each other's freight cars has generally served to reduce the incentive for replacement of obsolete freight equipment. However, the number of new freight cars purchased has increased considerably in recent years in the Boston region and in the nation. (See Table 2.) The trend has been toward using larger, lighter freight cars to increase c apacity, reduce dead weight and thereby increase efficiency. Specialized freight cars have also been purchased to accommodate large volumes of certain commodities with peculiar bulk weight characteristics.

Passenger Car Equipment There has been less expenditure for new passenger car equipment in both the Boston region and the nation. The total number of railroad passenger cars in use has declined considerably in the last few years. The new passenger cars which are in use, however, are lighter, more attractive and more comfortable to ride in. The Boston region has taken advantage of improved passenger car equipment in the form of the Budd cars and the Talgo train. (See Table 3.) The Budd car is considerably more flexible than earlier passenger cars; it is self-propelled, moving backwards and forwards on its own power; it can be operated as a single unit or coupled into trains according to the variable traffic volume of different routes. By 1956, the Boston and Maine owned 108 Budd cars for commuting purposes, the largest number owned by any single system in the nation. The acquisition of this fleet permitted the retirement of inefficient steam locomotives and the elimination of some yards. For intercity passenger service, the Boston and Maine also acquired a new Talgo train which features a low center of gravity and special connections between cars. As early as 1952 the New Haven acquired 40 Budd cars can by 1954 had a fleet of 100 commuter passenger cars. As of 1961, 24 of the Budd cars were in service in the Boston region.[1] The locomotive-pulled passenger coach has received less emphasis in Boston's equipment modernization than rail-diesel (Budd) cars. (See Tables 3 and 4.)

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[1] Accounting Department, New York, New Haven and Hartford Railroad, November, 1961.

Fixed Plant

The railroad fixed plant can be described in terms of two distinct component parts of the system: the road over which the vehicle moves and its terminal facilities. The railroad right of way in the Boston region can be conveniently discussed in terms of the road itself, its design standards and its track pattern.

Road Characteristics The railroad right of way is composed of the roadway subgrade, ballast, ties and the rail itself. Although most of the railroad rights of way today appear adequate for present and future loads, a considerable expense for maintenance is required to maintain the roadway in proper operational conditions. The subgrade must be continually ditched for proper drainage; the ballast or rock must be renewed constantly so that rails do not heave or buckle from contractions or expansions caused by extremes of temperature; specially treated wooden ties that help keep the track in line must be replaced from time to time; the rail itself bearing the constant friction of passing wheels must be maintained to meet the general requirement of girder stiffness. The joints between adjacent rails that allow for normal contraction and expansion are starting points of deterioration that require 25 per cent of the time, effort and expense spent on the right of way. The difficulties of road maintenance are compounded because the roads are geographically diffused while railroad administration and shops tend to be centralized. Furthermore, most maintenance on the road must be performed while the railroad is in operation.

In the Boston region, considerable improvement of road has occurred on more profitable lines: old rail has been replaced by new rail; new ballast and ties have been added.

Road Design Characteristics and Improvements Like the rights of way of other types of transportation, the railroad encounters certain physical restrictions in regard to curves and grades. When curves or grades

are unduly sharp, actual running time is reduced in comparison to the maximum speed attainable and limitations are put on the load carried. Whereas one per cent grades and six degree radius of curvature limitations were common in early railroad construction, design standards of 5 per cent grade and one degree minimum radius of curvature are now considered ideal for maximum efficiency. Bridges are often responsible for imposing weight limitations on the load that can be carried by railroad. Interference at grade with other rights of way, such as highways that cross the rail right of way, cause slow-downs that reduce running time. Such conflicts also constitute a safety hazard which contributes to expensive accident claims. Elimination of private and public grade crossings has increased running time and reduced accident claims. Major projects of this type within the Boston region have been accomplished by the Massachusetts Department of Public Works at Boston and Maine crossings in Winchester with consequent effects on the traffic and parking patterns of those areas.

Track Patterns A track pattern of turnouts, crossovers, sidings, auxiliary or branch tracks and parallel main tracks has been evolved to meet the needs of geographically diffused customers and to provide capacity for high-density traffic. A double-track main line provides four times as much capacity as an equivalent single track line with only 80 per cent increase in investment. The supporting communications and signal systems facilitate the distribution of traffic, maintaining proper headways within the confines of the required density and frequency of service. Due to recent traffic trends, some main and branch lines appear to be either under- or over-equipped to handle traffic. Circuitous, duplicating and unprofitable routes are the heritage of early railroad construction when numerous branches were built to either undercut or prevent competition with other railroads.

By 1959 there were 530.5 route miles of track in suburban passenger service in the Boston area.[1] Although the decline in railroad traffic has resulted in a general reduction in the total mileage of road (See Figure 2 and Table 5), Boston still has half the route mileage of New York and more track miles than Chicago, Philadelphia and Cleveland. (See Table 6.) With the density of traffic declining on multitrack main lines, curtailment has occurred through the elimination of extra tracks. Whole branch lines upon which demand for service is sparse have been eliminated or abandoned. This reduction in trackage may reduce the effectiveness of railroads as a competing mode of transportation by reducing the large carrying-capacity advantage of railroads and limiting the railroad's geographical scope of coverage. However, with the installation of a new, more efficient automatic communication and control system known as Centralized Traffic Control (CTC), reduction of duplicating miles of track on high-density main lines has occurred with an actual increase in traffic-handling capacity. The Boston and Maine has been particularly active in utilizing CTC. Although the system has been installed widely outside the region, single tracking within the region is on the Stony Brook branch between Ayer and North Chelmsford, on the Fitchburg freight cutoff extension at Hills Crossing and Somerville Junction and on the main line between North Beverly and Newburyport.

Terminal Facilities Railroad terminal facilities transfer, discharge or assemble persons or commodities. Yards and terminals transform cars into trains. After cars are inspected for mechanical condition, they are classified and switched into groups according to destination and finally

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[1] American Municipal Association, The Collapse of Commuter Service - A Survey of Mass Transportation in Five Selected Cities (Washington, D.C., 1959), p. 17.

TABLE 5

MILEAGE OF TRACK OWNED, LEASED AND OPERATED BY BOSTON RAILRAODS, 1929-1959

	New Haven				Boston and Maine			
	1929	1959	Change 1929-59	%	1929	1959	Change 1929-59	%
Miles of Road	2,133	1,762	-371	17.4	2,077	1,557	-520	25.0
Miles of 2nd Main Track	836	447	-389	46.5	611	497	-114	18.6
Miles of all other Main Track	267	223	- 44	16.4	10	10	--	--
Miles of passing, way switching, and yard switching track	2,066	1,287	-779	37.6	1,338	822	-516	37.4
Total all track	5,302	3,719	-1,583	30%	4,036	2,886	-1,150	28.6%

Source: Interstate Commerce Commission, Statistics of Railways in the United States, 1929, and Transport Statistics in the United States (Bureau of Transport Economics and Statistics, 1960).

TABLE 6

ROUTE MILEAGE OF SUBURBAN RAILROAD IN BOSTON AND OTHER METROPOLITAN AREAS, 1959

		Route Miles Operated		
	Single Track	Double Track	Three or More	Total Suburba Service
NEW YORK	349.8	542.6	278.9	1,171.3
CHICAGO	78.9	189.3	149.3	417.5
PHILADELPHIA	130.0	241.1	24.3	395.5
BOSTON	273.2	207.8	49.5	530.5
CLEVELAND	---	119.0	---	119.0

Source: *Collapse of Commuter Service, A Survey of Mass Transportation In Five Selected Cities*, Washington, D. C. 1959.

assembled and dispatched. Because of the physical design restrictions of the railroad right of way, these complex movements require considerable space for track. This series of operations is responsible for much of the idle time and delay of rolling stock and can easily nullify the improved running times obtained through technical improvements in other parts of the system. It has been estimated that approximately one half of the money and two thirds of time expended in moving freight from origin to destination is spent in this process. This operation, therefore, can seriously affect the railroad's competitive position with other forms of transportation in terms of convenience, time and service to the customer.

Railroad terminal facilities can be broadly defined to include yards, large city passenger terminals and community way stations. With declining passenger traffic, many way stations and terminals in the Boston region are now excessive to the needs of the railroads. Operating and maintenance costs are higher than is warranted by services now provided by these stations. The stations, often of grandiose design, are now inefficient in handling passengers and baggage. While more flexible rolling stock tends to diminish the need for large yards, the effects of this trend are counterbalanced by the increased use of longer trains which require more yard space. The consolidation of diffuse maintenance and repair yards into centralized locations have also obviated the need for other yards.

By 1958, the Boston and Main railroad had sold or contracted to sell 106 stations anticipating an annual reduction in costs of $235,000.[1] Its widespread use of Budd cars allowed the retirement of a passenger yard in in Boston in 1957. The Boston and Maine has also consolidated repair and

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[1] Annual Report of the Boston and Maine Railroad, 1958.

maintenance facilities at its yards located in Billerica. The New Haven has sold a number of stations and has abandoned its repair and maintenance facilities at Readville on the Boston-Dedham line in favor of consolidated shop operations near New York City. It has, however, established a new passenger station on Route 128 with easy highway access to the suburbs.

Because of the already built-up nature of many communities in the region and because of the blighting factor caused by smoke emanating from the old steam locomotives, stations and yards were located near, but rarely in the center of, community business districts. Nevertheless, these were strategic locations that resulted in advantages and disadvantages for the railroads. Because of location, ad valorem taxes were high, adding to operating costs and providing further incentive for abandonment of such facilities. However, if taxes on these properties were high, real estate development potential in other uses was often higher. Thus, high taxes and good real estate development potential have abetted the trend to abandon current station and yard holdings. Certain technological improvements have helped to make possible these changes. With improved centralized communication systems, railroads have used a system of "prior classification" where freight cars are classified and designated long before they reach their ultimate destination. This is accomplished outside the built-up central metropolitan area through the use of belt railroad lines that by-pass the congestion existing in the center and avoid backhaul. Yards located in low-value rural or suburban locations on these belt routes could be used for the assembly and dispatching of freight cars and trains, thus allowing retirement of some intown yards and stations.

Abandoned stations sites have, in some cases, been used as parking areas at the periphery of the business districts, as in Woburn and Salem. In other cases, these buildings and yards have been converted to light industrial uses, warehousing or other commercial uses. In Lawrence, a

portion of the Boston and Maine yards have, for example, been used by wholesaling and warehousing concerns. The abandoned Readville yards of the New Haven line have been used by a national food concern as a distribution and warehousing center for the region.

The most spectacular development possibilities lie in the station and yards located in or near the central city of Boston where land is scarce and yard and terminal facilities are strategically located in the path of natural growth of the central business district and its secondary centers. The $150 million Prudential complex of offices, hotel and convention center projected for yards formerly used by the Boston and Albany and New Haven railroads for passenger cars is an excellent example of the real estate development potential of abandoned yards. Abandonment was made possible by the sharp decline in passenger traffic allowing consolidation of yard service service in Allston.

There is a belt railroad arcing from Mansfield in the south via Framingham to Lowell, Marlborough, Fitchburg, Nashua and Concord, New Hampshire, connecting the New Haven, Boston and Albany, and Boston and Maine systems. Framingham is a key interchange on this belt system and a growing automobile assembly and manufacturing center. The Boston and Albany has recently bought 18 acres of land in that town near its Milford Branch to be developed into marshaling yards. With the projected turnpike extension into Boston along the main line of the Boston and Albany and a proposed highway interchange and truck terminal in the yards in Allston in conjunction with the turnpike, further freight yard development for this system could occur in the Framingham area.

A substantial portion of the Boston and Maine yard service is in Boston and Somerville. Although these yards, located near downtown, may have

the advantage of reducing switching and terminal work for traffic in or near Boston, there is the possibility that some of the operations performed at the Boston yards could be shifted to other Boston and Maine yards located on the main freight line at Greenfield in western Massachusetts. The North Station terminal area already comprises a substantial investment in hotel, offices and assembly facilities. Further commercial development is possible if the Boston and Maine plans to abandon all commuter passenger service are realized. Such plans await completion of a major study on the North Terminal area. Scheduled abandonment of the yards in back of the North Terminal area has resulted in the sale and development of approximately 60 acres of land in Boston, Somerville and Cambridge for industrial use. A dozen firms have taken options on the land for the purposes of constructing plant and warehousing facilities.

The New Haven railroad has long expressed a desire to dispose of South Station terminal in Boston. Various proposals have been made for new uses at this strategic location: office center, parking garage, civic stadium and apartment complex. With legislative proposals to fill in Fort Point Channel and the possible extension of the Massachusetts Turnpike into the area, further development potential exists for the extensive yards back of South Station.

General Trends

Although railroads carry a greater volume of freight now than prior to World War II, their share of the total market declined sharply. Other modes of transportation, notably trucks, ships, airlines and pipeline increased their share of freight traffic. The percentage of total intercity freight traffic carried by railroads declined from 75 per cent in 1929 to about 67 per cent in 1946 to an estimated 44 per cent in 1960.[1] During the last ten years, however, the decline in freight traffic has been both relative and absolute and is the most important problem facing the railroads. The decline has been particularly acute on railroads serving the Eastern District, especially New England. Despite adverse trends, however, railroads still carry more than twice the ton-miles of any competing mode of transportation.[2]

As Figure 6 shows, Eastern District railroads increased the amount of revenue ton miles[3] carried by about ten per cent during the single year 1951. Volume declined sharply during the 1954 recession but rebounded to the 1951 level by 1956. This improvement was short-lived; freight volumes declined to a new low during the recession of 1958 and have not yet recovered. Freight traffic on eastern railroads in 1960 was still 12 per cent below the 1950 level. Although the New Haven and Boston and Maine generally follow the same pattern as Eastern District railroads, they have not exhibited the same resiliancy during the postwar periods of economic recovery.

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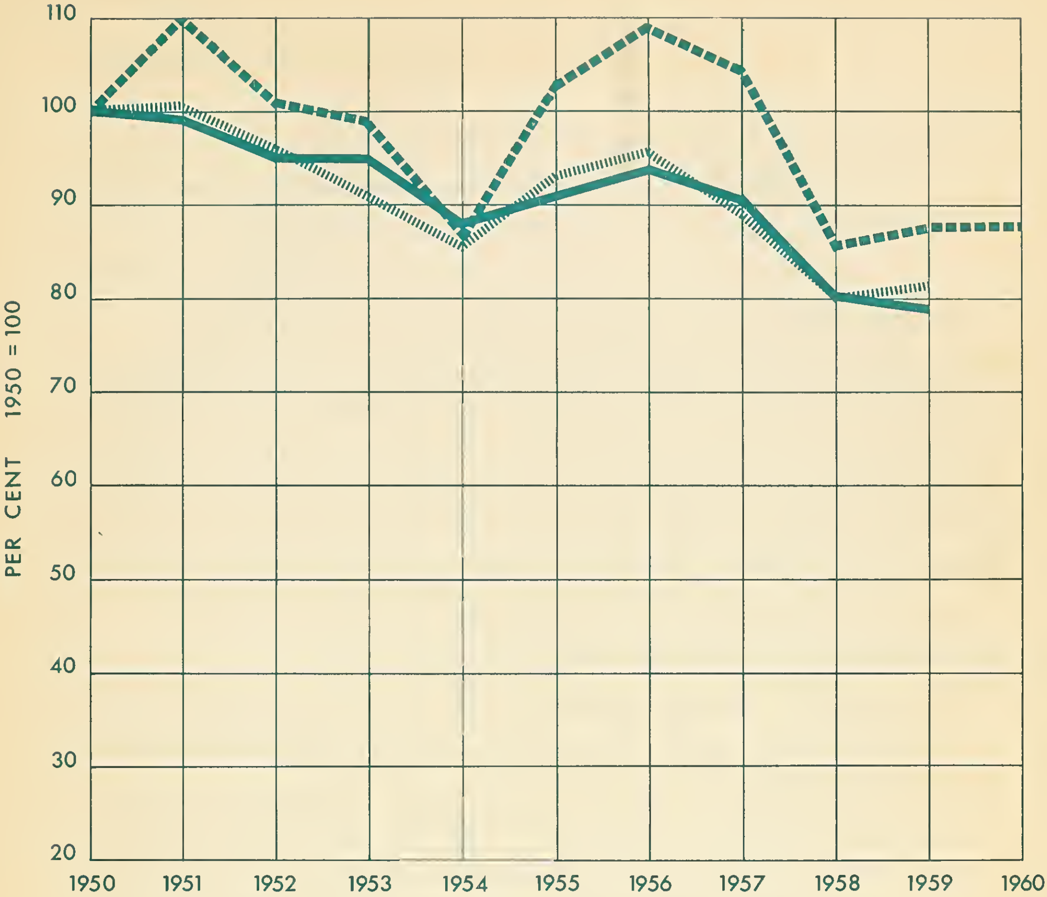
1. Interstate Commerce Commission, op. cit., p. 59.
2. Loc. cit.
3. Revenue ton-miles are the total number of revenue tons transported and the distance each ton is carried. The measure indicates the quantity and distance goods are moved and is a practical indicator of the volume of freight moved.



FREIGHT REVENUE TON MILES PERCENTAGE CHANGE, 1950 – 1960

		1950 REVENUE TON MILES
▪▪▪▪▪▪▪▪	EASTERN DISTRICT	249.5 MILLIONS
▬	B. & M. R. R.	3.2 MILLIONS
⦀⦀⦀⦀⦀	N.Y., N.H. & H. R.R.	3.8 MILLIONS

SOURCE: INTERSTATE COMMERCE COMMISSION, TRANSPORT STATISTICS IN THE UNITED STATES

These two Boston railroads, whose trends are remarkably similar did not exceed their 1950 volume during the decade and with volume drifting downward, by 1960 the freight tonnage they carried was about 20 per cent below the 1950 level.

A 1959 survey of the New England freight market relates trends in freight traffic to the economy of the area and has been authoritatively cited as being generally applicable to Boston railroads.[1] Except for anthracite coal and textiles, the economic activity of the customers who traditionally do business with railroads has increased by about 31 per cent during the period. The railroads have not only failed to capture a share of expanding market, but have lost traffic to other competitors, chiefly motor carriers.

Aside from the general economic and technological factors already cited (see pp. 35-41), the survey identified other more specific factors which help to explain the decline in railroad freight activity. Customers are maintaining smaller inventories and are, as a result, placing greater emphasis on speed and dependability of delivery. Small shipments tend to minimize the bulk rate advantage of railroads. In addition, the cost of loading from rail sidings is expensive for small tonnages. Deterioration of service, such as excessive delay in classification yards, poor switching service, uncoordinated freight schedules and the practice of holding for tonnage, were also reported as reasons for erosion of rail freight traffic.

Composition of Traffic

The composition of freight traffic in 1954 on railroads serving New England was generally more diversified than railroads in the rest of the

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[1] Arthur D. Little, Inc., The New England Freight Market; A Preliminary Report to the New England Railroad Presidents' Conference (Part I, Cambridge, December 1959), p. 2.

Eastern District. As Table 7 shows, the railroads serving the Boston region, like railroads in New England, carried a much larger proportion of miscellaneous manufactured goods and products of agriculture than other Eastern District railroads. The large share of manufactured goods reflects the importance of manufacturing in the Boston region and in New England as a whole. The importance of agricultural products stems largely from potatioes originating in Maine. Mineral products, chiefly coal, make up about 20 per cent of the tonnage carried by Boston railroads. Although Boston railroads carry a large proportion of mine products thatn than New England railroads as a whole, the share of this category of commodities is still substantially below other Eastern District railroads and total tonnage carred by Boston region railroads appears to be diminishing (see page 38). The Boston region railroads' share of other groups of commodities, such as animal and products, forest products and forwarder traffic, is generally higher than other Eastern District railroads, reflecting a more diversified regional economy.

The composition of freight traffic on individual railroads serving the Boston region is generally quite similar. The small difference that do occur mainly reflect differences in the areas served by each railroad.

The New Haven railroad's mix of freight commodities with a slightly higher percentage of manufactured products, products of mines, forwarder traffic and less-than-carload freight, reflects its highly urbanized and industrial territory much of which lies outside the Boston region. In terms of total tonnage, the New Haven's leading commodities were coal, cement, manufactured iron and steel. Other important products were animal and poultry feed, scrap iron and steel, potatoes, flour wheat and fresh meat.

The Boston and Maine, on the other hand, shows a higher percentage of agricultural, forest and animal products than the New Haven. This

composition of freight reflects the direct connection between the Boston and Maine and the rural territory of northern New England, particularly Maine forests and potato farms. While animal and poultry feed has overtaken coal as the leading bulk commodity, potatoes are not far behind in importance. Cement and forest-based products such as lumber, woodpulp and manufactured paper products are also leading commodities carried by the Boston and Maine.

The freight composition of the Boston and Albany railroad more nearly resembles the New Haven indicating a similarity in in the areas served by each line. The Boston and Albany railroad carries a higher percentage of mine products and less-than-carload freight than other Boston railroads, but a smaller percentage of agricultural and forest products, emphasizing its highly industrialized territory.

Revenue and Costs

The average revenue per ton mile reflects the type of railroad commodities carried and rates charged, as well as the cost of freight operation. Boston and New England railroads have a higher average revenue per ton mile than either the Eastern District or the nation. (See Table 8). Because of the general increase in freight rates since 1929, the average revenue per tone mile has increased substantially in all sections of the nations during the last thirty years. However, in spite of the fact that the percentage increase has generally been greater in the rest of the nation than in New England, the revenue per ton mile differential between Boston and New England railroads and railroads in the nation was wider in 1959 than in 1929. Relatively high per ton mile revenues on Boston and New England railroads can be partly explained by the fact that over half of the commodities carried are manufactured and miscellaneous products rather than low-value bulk commodities. However, high operating costs are an

TABLE 7

FREIGHT COMPOSITION, BOSTON, NEW ENGLAND AND EASTERN DISTRICT, 1954

Commodity Group	New Haven (per cent)	Boston and Maine (per cent)	Boston and Albany (per cent)	New England Region (per cent)	Other roads in Eastern District (per cent)
Products of Agriculture	9.80	12.03	5.65	14.09	6.49
Animals and Products	3.39	3.87	4.62	2.84	1.20
Products of Mines	21.99	20.64	26.55	18.99	55.84
Products of Forests	4.61	6.18	3.41	7.97	2.41
Manufactures and Misc.	56.72	55.28	55.21	53.63	32.91
Forwarder Traffic	1.71	.43	2.28	.76	.59
Total Carload Traffic	98.22	98.43	97.72	98.28	99.44
LCL Freight	1.78	1.57	2.28	1.72	.56
Total All Freight	100.00	100.00	100.00	100.00	100.00

Source: "A Railroad Policy for New England," in Public Transportation For New England, New England Governors' Committee on Public Transportation, Interim Report No. 7, p. 20.

TABLE 8

AVERAGE REVENUE PER TON MILE OF FREIGHT, BOSTON, NEW ENGLAND, EASTERN DISTRICT AND THE NATION, 1929 and 1959.

	Revenue Per Ton Mile (Cents)	
	1929	1959
BOSTON AND MAINE	1.73	2.16
NEW HAVEN	2.00	2.35
NEW ENGLAND REGION	1.78	2.35
EASTERN DISTRICT	1.05	1.59
UNITED STATES	1.08	1.40

Source: Interstate Commerce Commission, Statistics of Railways in the United States, 1929 and Transport Statistics in the United States (Bureau of Transport Economics and Statistics, 1960.)

important reason for the high revenue per ton mile, as is the composition of freight.[1] The low density of freight traffic on Boston railroads results in high costs of freight operations because of overcapacity and consequent poor utilization of railroad locomotive power and fixed facilities. Short hauls and the related high terminal and switching costs (see pages 40-41) characteristics of Boston railroads are significant factors in the high cost of freight operation.

Summary - Revenue and Tonnage

A few significant trends in both the revenue and tonnage of freight carried by New England railroads from 1950 to 1957 are applicable to Boston railroads.[2]

1. About 45 per cent of the total tonnage lost by New England railroads was represented by products of mines, chiefly coal. The shift of consumer markets from coal to petroleum and natural gas which are shipped via pipeline and water is responsible for this trend.

2. Manufactured and miscellaneous products accounted for a 14 per cent increase in revenue, but total tonnage actually declined slightly. This group of products accounted for over 60 per cent of total New England rail revenues despite the fact that much of the volume in this category now moves by truck.

3. Revenues from products of agriculture increased 13 per cent, despite a significant decline of eight per cent in tonnage.

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[1] "A Railroad Policy for New England," op. cit., p. 24.

[2] Arthur D. Little, Part I, op. cit., p. 6.

4. Forwarder traffic increased in tonnage by about 18 per cent while less-than-carload freight decreased sharply (60 per cent). Most of this less-than-carload freight is now shipped by truck.

A substantial decline in railroad passenger volume has been one of the main problems plaguing eastern railroads during the last decade. The principal reason for railroad passenger losses has been the diversion of traffic to other modes of transportation. Automobiles now carry about 90 per cent of passenger traffic, and railroads, buses and airplanes compete for a share of the remaining ten per cent of the market.[1] While railroads accounted for about 13 per cent of passenger traffic as recently as 1947, they only accounted for about 3 per cent in 1960. In 1947, the railroads' share of the total passenger travel market was larger than that of airlines or of buses. By 1960, however, more passengers were carried by airlines, making them the only carrier other than the automobile to increase its share of the market.

Railroads began to lose passengers to the automobile in the middle 1920's. By the 1930'3 railroads began to feel the effects of competition from buses. Passenger volume continued to erode under this double attack until World War II when the railroads experienced a brief resurgence due to gasoline and tire rationing and increased military use. After the war the automobile increased its share of the market at an accelerated rate. At the same time, the railroads began to lose long distance intercity passengers to the airlines.

A comparison of trends in revenue passenger miles[2] of railroads in the Eastern District with the two major railroads that serve the Boston region indicates that railroads in the area have shared in the passenger decline. (See Figure 7.) Eastern District railroads showed steady decline in

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[1] Exhibit to Eastern Railroad Problems; The Serious Situation and Its Causes, Eastern Railroad Presidents' Conference (Jersey City, October 1961), p. 54.

[2] "Revenue passengers miles" are an effective measure of railroad passenger traffic volume. Passenger miles are the product of the number of passengers carried and the distance each travels.

railroad, however, has not declined as sharply as most railroads in the eastern portion of the nation. In fact, passenger volume actually increased on the New Haven in the early 1950's but this was followed by a steep decline in the second half of the decade. While passenger volume of railroads in the eastern United States declined over a third, New Haven volumes declined only about a fifth in the 1950-1959 period. (See Figure 8.)

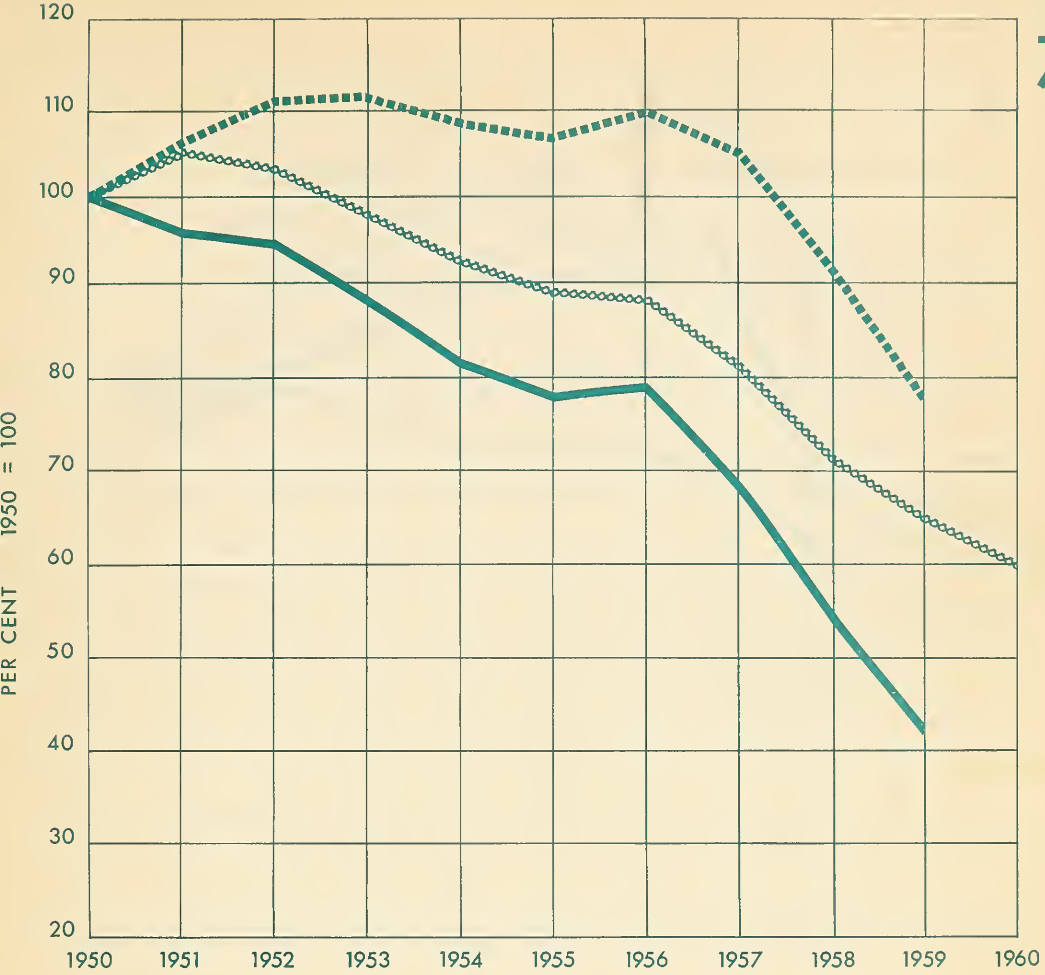
Passenger volumes on the Boston and Maine have followed a far less favorable trend. Volumes have shown a steady decline amounting to no less than 60 per cent in the decade. However, passenger volume trends for the New Haven railroad include a considerable amount of traffic in the New York metropolitan region. In addition, this gross comparison does not distinguish between interstate and local commuter passenger traffic which have declined at different rates, for different reasons and wtih different economic consequences.

The railroads' passenger-carrying role has traditionally been considered by many railroad managements to be secondary to the more profitable freight-carrying function. Moreover, the short-haul or commuter passenger business is usually considered to be a deficit operation.

Railroad passenger service is divided into two distinct parts based on differences in length of trip and economic function: intercity passengers are carried over moderate to long distances between major cities, and commuter passengers are carried from home to work over short distances within large metropolitan areas.

The pattern of railroad traffic relative to passenger and freight service and the composition of passenger traffic in regard to long distance and local commuter service can have important effects on the railroad's relative financial position. The composition of railroad service in the Boston region differs markedly from railroads in other parts of the nation and explains much of the difference in passenger trends noted above.

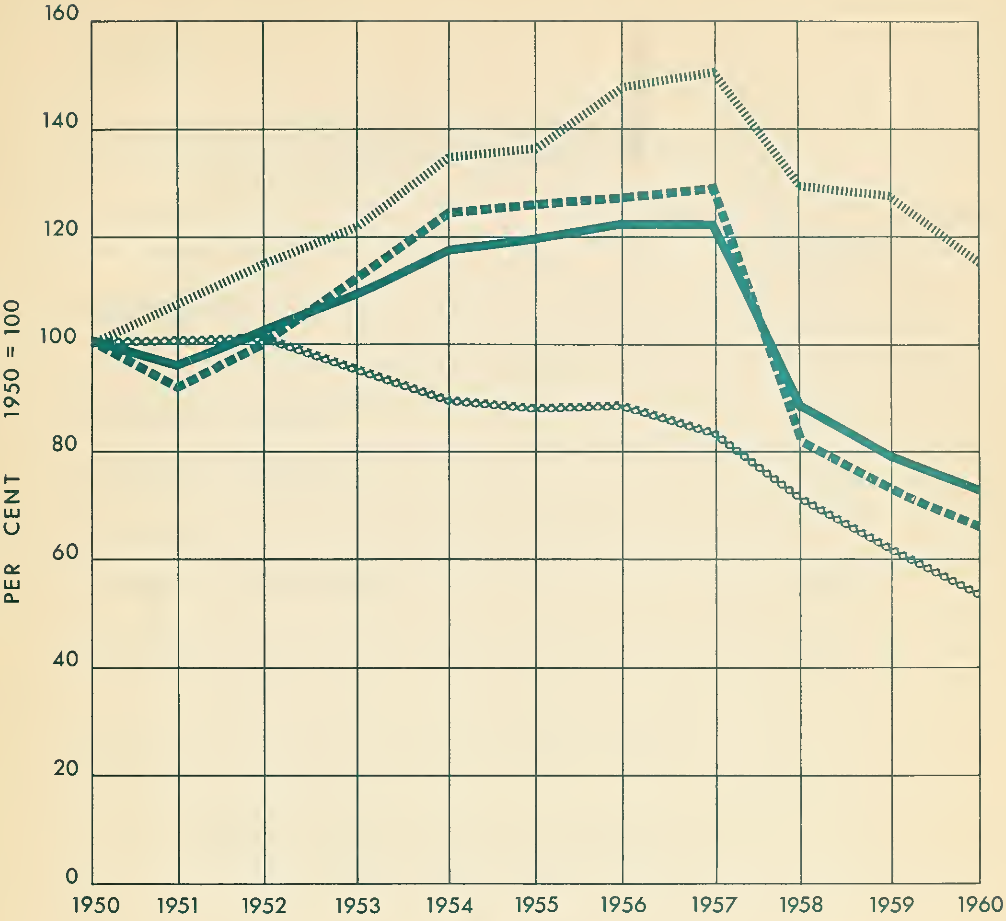
7



REVENUE PASSENGER MILES
PERCENTAGE CHANGE, 1950 – 1960

		1950 PASSENGERS
━━━━━━	EASTERN DISTRICT,	15.9 BILLIONS
∞∞∞∞∞∞	B. & M. R.R.,	0.45 BILLIONS
■■■■■■	N.Y., N.H. & H.R.R.,	1.8 BILLIONS

SOURCE: INTERSTATE COMMERCE COMMISSION, TRANSPORT STATISTICS IN THE UNITED STATES



NEW HAVEN RAILROAD PASSENGERS, BOSTON REGION, PER CENT CHANGE, 1950 - 1960

▪▪▪▪▪▪ 15 MILES FROM BOSTON, 1950 PASSENGERS (2.2 MILLIONS)
┆┆┆┆┆┆ BEYOND 15 MILE ZONE, INTRASTATE (0.73 MILLIONS)
✕✕✕✕✕✕ INTERSTATE (0.94 MILLIONS)
▬▬▬ TOTAL (3.87 MILLIONS)

SOURCE: THE NEW YORK, NEW HAVEN & HARTFORD RAILROAD, ACCOUNTING DEPT.

TABLE 9

PER CENT OF FREIGHT OPERATING INCOME
CONSUMED BY PASSENGER OPERATING DEFICIT*

	Total Cumulative Percentage 1954-1960
BOSTON AND MAINE	69.08
CENTRAL RAILROAD OF NEW JERSEY	75.48
ERIE-LACKAWANNA	58.55
NEW YORK CENTRAL	50.80
NEW YORK, NEW HAVEN AND HARTFORD	105.57
PENNSYLVANIA RAILROAD	53.77
READING	37.65

*Net operating income and net operating deficit.

Source: Exhibit to Eastern Railroad Problems, Eastern Railroad Presidents' Conference, Jersey City, October 1961.

The percentage of total business devoted to passenger service has been especially high for railroads serving the Boston region. If passenger service is largely a profitless service, as is often claimed, then this pattern obviously aggravates the earning problems of the region's railroads. Table 9 shows the percentage of freight income consumed by passenger deficits for major railroads serving the eastern part of the nation. It should be noted that the size of the passenger deficit as computed according to ICC formula is subject to debate because of the difficulties in allocating joint costs. (See page 33.) However, the table gives a good general indication of the impact of passenger service operations on railroad earnings. The New Haven railroad cumulative passenger deficit from 1954 to 1960 consumed the largest percentage of freight railway operating income of all major railroads in the Eastern District. Indeed, so great was this deficit that it actually consumed all of the profit from freight operation contributing to an overall operating loss. The Boston and Maine was not far behind with the third highest cumulative passenger deficit percentage of the major eastern railroads.

There are several reasons for the high proportion of passenger business on railroads serving the Boston area. The New Haven railroad provides service between New York and Boston and competes with other modes of transportation for one of the highest volumes of intercity travel in the country.[1] With its terminals located within two major metropolitan areas, the New Haven railroad also has, apart from the Long Island railroad, proportionally more passenger traffic than any other railroad in the U. S.[2] Although passenger volume carried by the Boston and Maine is not comparable to the total volume carried by the New Haven, it now carried the largest number of commuters into Boston. The small number of long-distance passengers carried by the Boston and Maine is a result of its geographical position, the scope of its operation and the characteristics of

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[1] Gottmann, op.cit. pp. 639-644.

[2] Six Month Interim Report, New Haven Railroad, op.cit., p.1.

the territory it serves. As compared to the New Haven, the Boston and Maine is a medium-sized railroad serving only one major metropolitan area, Boston, and the less densely populated territory to the north and northwest. Its connections with other major cities are indirect and the demand for intercity travel in the territory served by the railroad is low. Aside from geographical factors however, the high proportion of railroad passenger business in the Boston area is a carry-over from the unusually important role of passenger service and the characteristically high urban densities during the period of early development of railroads in the Boston region as well as in the larger northeastern urban area of which it is a part. (See pages 13-17.)

Long Distance Intercity Travel

The Boston region is located at the northern end of the eastern megalopolis. Metropolitan areas and smaller independent cities are so closely spaced in this area that development is virtually continuous and the density of urban population in this area is among the highest in the nation. Railroads serving the Boston region concentrate on short-haul intercity travel through or within the northern portion of this megalopolis.

The railroads' share of short-haul intercity travel in the region has declined considerably because of inroads made by competing modes of transportation. Railroads are slower than airplanes and have consequently lost passengers bound for medium to long range destinations. In spite of the fact that considerable travel time may be required between terminal and ultimate destination, airlines frequently have a time advantage over railroads. Moreover, since railroads are a more expensive way to travel and not much faster than automobiles and express buses operating on expressways they have lost passengers to private cars and intercity bus companies. And whereas railroads are an inflexible form of transportation with stops provided only at stations, automobiles and buses make more

frequent stops and provide door-to-door service. On the favorable side, some people find railroad travel more relaxing than travel by air or automobile.

Railroad intercity passenger service to points outside the Boston region has been reduced considerably over the years. Reductions in service have occured in response to decline in demand but they have also induced further declines in patronage.

The New Haven railroad, the chief intercity rail carrier for the region, now operates 14 trains per weekday from Boston to New York City, five of which are through trains to Philadelphia, Baltimore and Washington over Pennsylvania Railroad company tracks beyond New York. There are 22 trains runs on average weekday from Boston to Providence; eight of these are commuter trains that provide extensive local service within the region. The Boston and Maine runs only three trains per weekday over its route to Portland, Maine. Two of these trains go all the way to Portland, while one goes only as far as Dover, New Hampshire. All provide service to the Lawrence-Haverhill metropolitan area within the region. The Boston and Maine operates six trains per weekday to Portsmouth, New Hampshire, just beyond the borders of the region, and five trains to Concord, New Hampshire, with one run extending to Laconia, New Hampshire and another run going as far as White River Junction, Vermont. Through connections can be made at the latter point to the north and the west over other systems. The Boston and Albany provides three trains per weekday to Albany, New York, which also serve Worcester, Springfield and Pittsfield. Two trains every weekday go only as far as Springfield.

The metropolitan areas of Providence (population 816,000) Worcester (population 323,000), Portland, Maine, (population 121,000) and Springfield (population 479,000) are all significant generators of intercity travel but they are all located within a 100 mile radius of Boston where the speed, convenience and flexibility of automobiles operating on interstate expressways offer clear advantages over railroad travel. The longer (200 mile)

rail passenger haul to New York is probably a little less vulnerable to automobile competition but more susceptible to intercity bus and airline competition. The technology of the railroad plant is such that it generally has cost advantages relative to other modes of transportation for hauls over 150 miles. (In contrast, airlines have the highest line-haul cost.[1]) This advantage holds true, however, only if railroads carry a high volume of passengers approaching their large capacity.

Intercity traffic in the last decade on the New Haven railroad experienced a greater overall decline than local rail commuter traffic in the Boston region. (See Figure 8). Intercity rail passenger travel on the New Haven held steady during the first three years of the decade, declined slowly toward the middle of the period but accelerated its decline at the end of the decade. The total number of intercity passenger declined by almost a half from 1950 to 1959; in the same ten years, commuter travel inside the 15 mile zone from Boston declined by over a third and commuter travel beyond the 15 mile zone actually experienced a gain of 15 per cent. Commuter passenger figures may include a considerable number of through passengers from New York, traveling on New Haven main line through Providence.

Railroad Commuter Travel

Only five major cities in the United States - Boston, New York, Chicago, Philadelphia, and San Francisco - are served by commuter railroads. Table 10 indicates the magnitude and complexity of service in major railroad commuting centers. As might be expected, Boston ranks fourth, well behind larger metropolitan regions in the number of commuter passengers. If the number of independent railroad companies and major radial lines serving the centers is taken as indication of the complexity of the various systems, then Boston ranks third behind New York and Chicago but ahead of Philadelphia. In addition, Boston's railroads rank second to New York and ahead of both Chicago and Philadelphia in total route miles of track

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[1] National Transportation Policy, op. cit., p. 313.

in suburban service. (See Table 6.) Boston's large route mileage in the single track category, a gross indicator of the extent of branch lines, is responsible for this relationship. Numerous main lines and branch routes are a legacy from the nineteenth century when the economic prospects of the Boston region stimulated railroad overexpansion. For example, Boston has only half as many commuters as Philadelphia but uses almost twice as many lines to handled this smaller volume. In most railroad commuting areas passengers are densely concentrated along a few major axis of travel; in Boston, railroad passengers spread out in a diffuse pattern along numerous travel corridors.

The 50 per cent decline in Boston's rail commutation patronage from 1948 to 1959 is a little more severe than patronage declines occurring in other major railroad commuting centers during approximately the same period.[1] Only the Long Island railroad serving New York and the Northwestern and Milwaukee lines serving Chicago showed increases during this period. In the New York area, decreases ranged from 46 per cent on the Lachawanna and 48 per cent on the New York Central to 55 per cent on the Erie. In Chicago, commuter traffic declined 47 per cent on the Illinois Central and 25 per cent in the Rock Island railroad. In the Boston region decreases in patronage have become more pronounced in recent years. Here rail commuter patronage declined by over a third from 1948-1956 with the percentage decline almost doubling (60 per cent) from 1956 to 1961.

The number of persons using railroads to travel to downtown Boston has declined at a faster rate than the number of persons using other modes of transportation for downtown travel. Table 11 shows that while travel to downtown by all modes of transportation declined by almost 30 per cent between 1950 and 1959, railroads declined by about 36 per cent and the MTA declined by 31 per cent. However, a 28 per cent gain in downtown travelers using the private automobile occurred in this period. The decline in the

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[1] Ibid, , pp. 555-556.

number of railroad commuters is apparently attributable to the decreasing importance of downtown as an employment center as well as to increased use of the private automobile.

Table 12, showing the estimated number of weekday passengers on all Boston railroad commuter lines in 1948 and 1961, extends the 1949-1959 comparison to 1961 to take into account discontinuance of service on the Old Colony line and shows a regional decline in railroad passengers of 73 per cent. The New Haven's share of the total commuter traffic, however, fell below 40 per cent during the period, while the Boston and Maine's share advanced to over 50 per cent with the Boston and Albany maintaining a stable share. Considering the New Haven's abandonment of passenger service on the Old Colony division in 1960, it appears surprising that the percentage decline in patronage was not greater. Passenger volume on the Old Colony fell from 25,000 in the year 1947 to 10,000 in 1957. Of the 28,500 passengers lost by the New Haven from 1947 to 1961, about 90 per cent of this loss could be attributed to the gradual decline and eventual abandonment of service on the Old Colony line. Table 12 shows that a number of New Haven commuter lines and branches did not experience nearly as great a decline as lines in other systems or region as whole, despite the complete loss of passengers on the Old Colony line. As noted earlier, the smaller declines occurring on several other commuter lines in the New Haven system is probably due to the 15 per cent increase in patronage in the areas more than 15 miles from Boston.

In general, Table 12 shows that patronage declines were great on lines of the Boston and Maine system serving sectors northeast, north and northwest of Boston and on the Boston and Albany line serving the sector west of Boston than on lines in the New Haven system serving the sectors southeast and southwest of Boston. Two of the three most heavily patronized lines are the Boston and Maine's New Hampshire division and the New Haven's Providence main line which provide interstate through passenger service north and south of Boston. Noncommuter interstate passengers

TABLE 10

SUBURBAN PASSENGER SERVICE: NUMBER OF COMPANIES, LINES, AND PEAK HOUR LOADS IN MAJOR COMMUTING CITIES, 1959

	Service		Total Number of Passengers			Weekday
	Companies	Lines	Annual	Weekday		Peak Hour
	(number)		(000's)	Total	Peak Hour	Percent of Total
NEW YORK	7	7	184,020	322,850[1]	208,690	64.8
CHICAGO	4	6	68,931	206,135	79,325	38.2
PHILADELPHIA	2	2	20,118	105,810	52,860	33.0
BOSTON	3	5	14,823	48,200	24,100	50.0

1. Excludes New York Central

Source: Gunther M. Gottfield, Rapid Transit Systems In Six Metropolitan Areas (Government Printing Office, Washington D. C., 1959); The Collapse of Commuter Service, American Municipal Association, Washington, D. C., 1959.

TABLE 11

PERSON TRIPS TO DOWNTOWN BOSTON BY MODE OF TRANSPORTATION, 1950-1959

Mode of	1950		1959		Change	
Transportation	Number	% of Total	Number	% of Total	Number	%
Railroad [1]	65,000	11.0	40,000[2]	7.0	-25,000	-38.5
MTA	245,000	41.0	170,000[2]	29.0	-75,000	-30.5
Automobile	290,000	48.0	370,000	64.0	+80,000	+27.5
Total	600,000	100.0	580,000	100.0	-20,000	-33.3

1. Includes relatively small number of commuters on independent bus lines.
2. 1959 Railroad and MTA passengers estimated by TPSG.

Sources: 1. Robert G. Davidson, M.T.A. Rapid Transit Parking Program for the Metropolitan Transit Authority (Boston, October, 1957).

2. Studies of Urban Transportation, Travel in the Boston Region 1959-1960, An Evaluation of Transportation Needs, Seminar Research Bureau, Boston College, Vol. III, (April, 1961).

TABLE 12

ESTIMATED WEEKDAY PASSENGERS ON INDIVIDUAL RAILROAD LINES, 1948-1961

Railroad Lines	Number of Passengers		Decrease	
	1948	1961	Number	Per cent
Boston & Maine				
Eastern Line	11,300	2,600	8,700	77.0
Western (Reading) Line	10,200	3,400	6,800	66.5
New Hampshire Division	15,600	4,900[1]	10,700	68.9
Fitchburg Division	3,400	900	2,500	73.9
Total	40,600	11,800	28,800	70.9
Boston & Albany (N.Y.C.)[2]	7,300	2,300	5,000	68.9
New York, New Haven & Hartford				
Needham Branch	2,100	1,700	400	19.0
Dedham Branch	4,200	1,500	2,700	64.2
Boston and Providence	3,800	3,400	400	10.5
Blackstone Branch	1,900	1,600	300	15.8
Stoughton Branch	300	600	+300[3]	+100.0
Old Colony	25,000	---	25,000	---
Total	37,300	8,800	28,000	76.0
Total Region	85,200	22,900	62,300	73.0

1. Includes Portland Division via Wilmington
2. Years of comparison for Boston and Albany are 1953-1962
3. Increase caused by private auto connection from areas where Old Colony service was discontinued

Source: Mass Transportation Commission, Demonstration Proposal, April 5, 1962; Boston and Maine Accounting Department, Monthly Passengers Handled In and Out of Boston.

are probably responsible for the relatively high volumes on the New Haven. The Boston and Maine Reading line is the most important line providing commuter service only.

There are five major factors that appear to influence the amount of railroad commuting from various sectors of the region to downtown. First and foremost, is the extent of expressway construction in the various sectors. The move to suburbia has largely been auto-oriented and suburban expressways connections are often in direct competition with parallel rail lines. Secondly, the growing decentralization of industry and retail service activities oriented to the highways have diminished the overall importance of railroad commuting to downtown Boston. Third, the amount of new population growth and residential construction in various sectors is related to the potential for railroad commuting, but the impact of growth is tempered somewhat by the first two factors. Fourth, railroads in the past were traditionally responsible for development of fashionable residential districts and estates of the wealthy, many of whom have retained the railroad commuting habit. Railroad travel retains something of a luxury flavor; out-of-pocket costs represented by railroad fare are probably higher than the out-of-pocket costs for automobile travel, and railroad cars are less crowded and more comfortable than MTA cars. Thus, areas of high average family incomes may exhibit a propensity to use railroad facilities. For example, Wellesley, a community with the highest percentage of families with incomes of more than $10,000 per year in the region also has a relatively high percentage of railroad commuters, a pattern which is repeated elsewhere in the region. Fifth, and closely related to the previous factor, communities with large numbers of white collar workers who work in downtwon services and financial enterprises seem to retain a strong affinity for railroad commuter service.

Railroad Commuting by Sector

Figure 9 shows the sector division and railroad lines serving the region. Figures 10 and 11 indicated the extent of decentralization by showing the location of major retail trade and manufacturing employment centers.

Northeast The Eastern line of the Boston and Maine which serves this sector has experienced the largest percentage decline in patronage of any single railroad commuter line in the region. There has been more postwar construction of major highway facilities in the northeast than in any other sector in the region, explaining part of the rail patronage decline.[1] The Mystic River Bridge, the Northeast Expressway, portions of Interstate 95, and Route 128 in this sector, and the Callahan tunnel were all built since the war. Also, because the Eastern main line runs along the coast, potential patronage in its immediate service area is limited and it is less conveniently located in relation to the rest of the sector than Interstate 95, the main north-south limited-access highway.

Although an important segment of Interstate 95 from Danvers to Revere is still missing, number of partially limited-access secondary roads (C-1, Route 1) help to satisfy automobile travel demand. Also important in this sector is the radial segment of Route 128 from Danvers to Gloucester which competes directly with the Gloucester branch of the Eastern line for Cape Ann commuters. Until Interstate Route 95 is completed to downtown Boston, however, Route 128 may have no clear advantage in serving the small amount of commuter travel from this distant portion of the sector.

Decentralization of commerce and industry has proceeded at a greater rate in the northeast than in many other sectors of the region. Lynn, Salem and Beverly, once independent communities, have become satellite cities with sizable industrial and commercial concentrations. In addition

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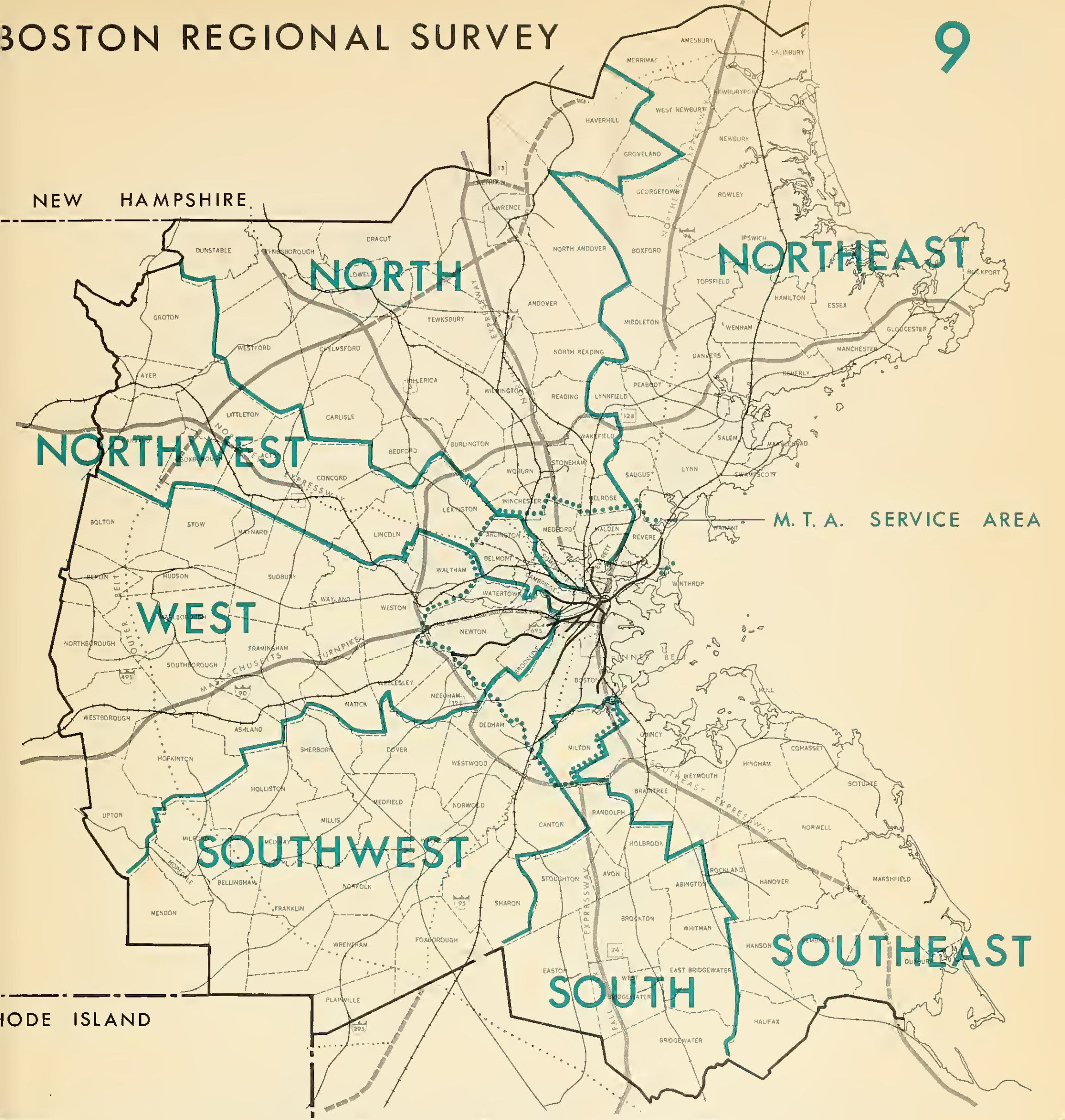
1. Seminar Research Bureau, Studies of Urban Transportation; Travel in the Boston Region 1959-1980, An Evaluation of Transportation Needs, Vol. III, (Boston College: April, 1961), p. 58.



SECTOR DIVISION
BOSTON REGIONAL SURVEY

GENERAL INFORMATION

- ▭ EXPRESSWAYS
  - ▪▪▪● UNDER CONSTRUCTION
  - ····· PROPOSED
- ▭ MAJOR HIGHWAYS
- ▭ SECONDARY HIGHWAYS
- ┼┼ MAJOR RAILROADS
- ┼┼ SECONDARY RAILROADS
- ━ RAPID TRANSIT LINES

NORTH

2560 ACRES

1

SQUARE MILES

0 5 10 MILES

PARED FOR THE MASS TRANSPORTATION COMMISSION

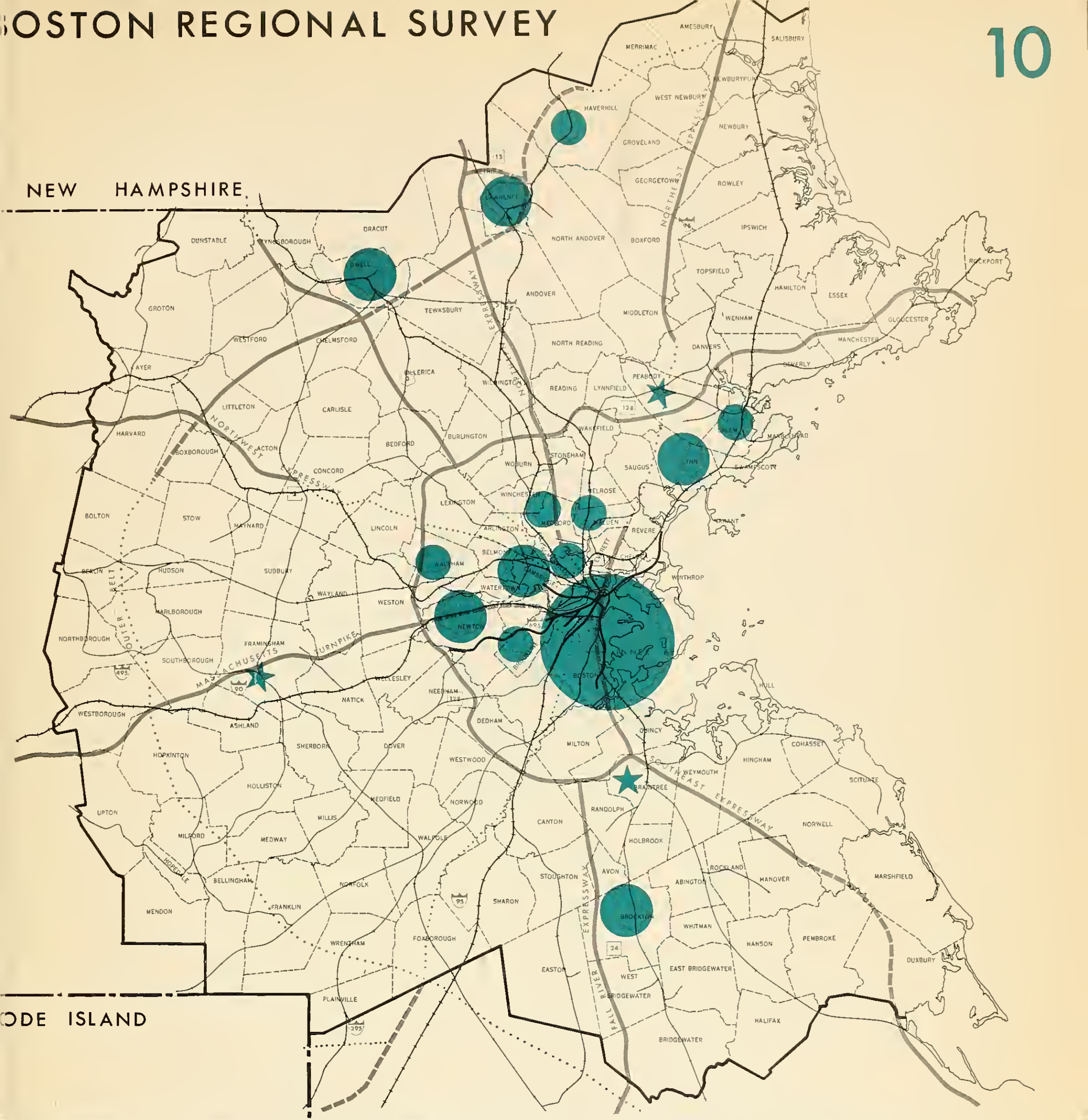
BY THE PLANNING SERVICES GROUP, CONSULTANTS

SYMBOL APPEARS ONLY WHEN LISTED ITEM IS SHOWN ON MAP

THE PREPARATION OF THIS MAP HAS BEEN FINANCED IN PART THROUGH AN URBAN PLANNING ASSISTANCE GRANT FROM THE U S HOUSING AND HOME FINANCE AGENCY UNDER THE PROVISIONS OF SECTION 701 OF THE HOUSING ACT OF 1954, AS AMENDED.

OSTON REGIONAL SURVEY

10



MAJOR CENTERS OF RETAIL SALES

RETAIL SALES, 1958

OVER $1,000 MILLION

$100 - 1,000 MILLION

$50 - 100 MILLION

★ MAJOR SHOPPING CENTERS

GENERAL INFORMATION

EXPRESSWAYS

UNDER CONSTRUCTION

PROPOSED

MAJOR HIGHWAYS

SECONDARY HIGHWAYS

MAJOR RAILROADS

SECONDARY RAILROADS

RAPID TRANSIT LINES

NORTH

2560 ACRES

1

SQUARE MILES

0 5 10 MILES

ARED FOR THE MASS TRANSPORTATION COMMISSION

THE PLANNING SERVICES GROUP, CONSULTANTS

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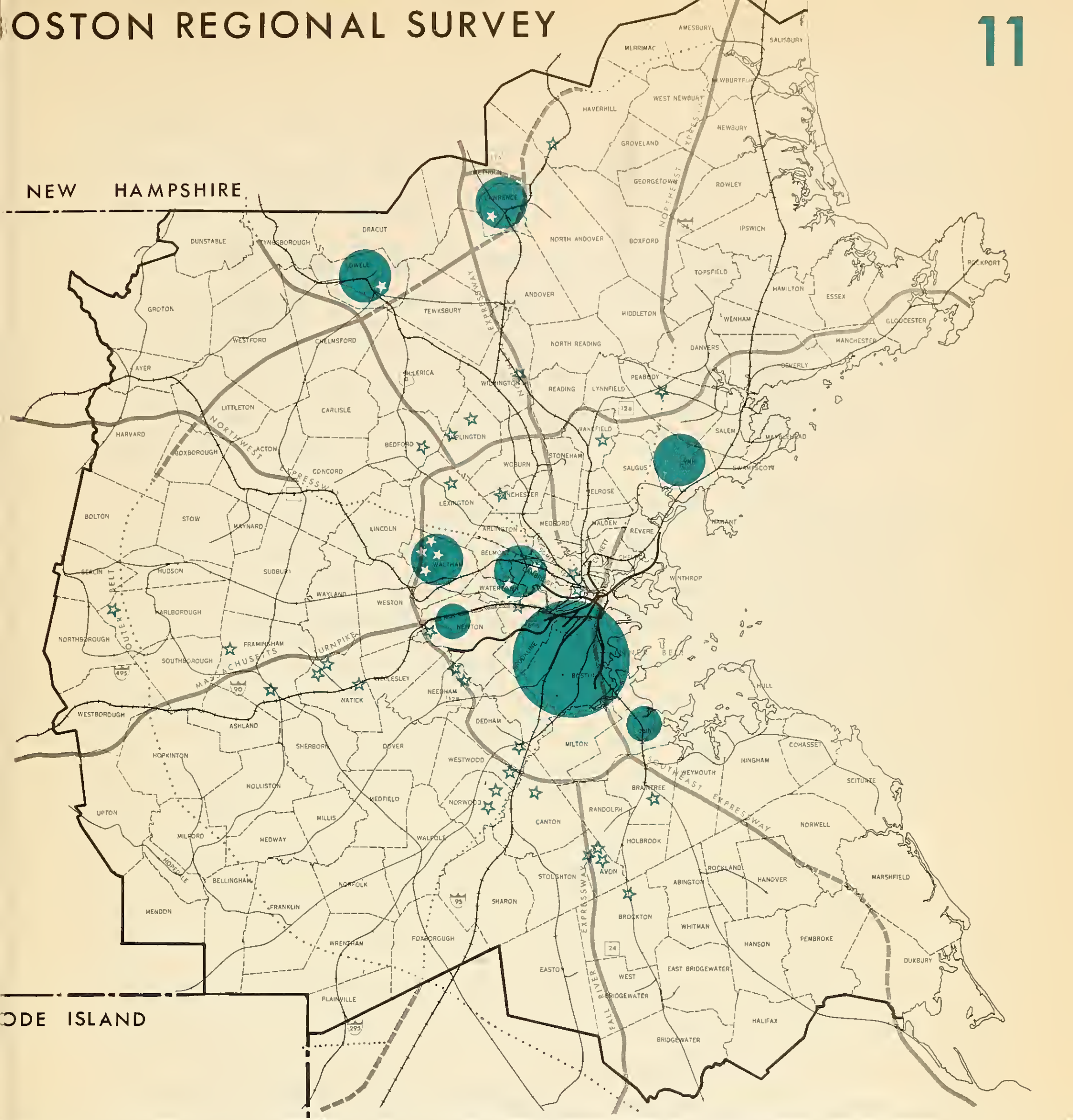
OSTON REGIONAL SURVEY

11



MAJOR CENTERS OF MANUFACTURING EMPLOYMENT

MANUFACTURING JOBS, 1959

- OVER 30,000
- 20,000 – 30,000
- 10,000 – 20,000

☆ INDUSTRIAL PARKS IN OPERATION, 1961

GENERAL INFORMATION

- EXPRESSWAYS
  - UNDER CONSTRUCTION
  - PROPOSED
- MAJOR HIGHWAYS
- SECONDARY HIGHWAYS
- MAJOR RAILROADS
- SECONDARY RAILROADS
- RAPID TRANSIT LINES

NORTH

2560 ACRES
1
SQUARE MILES

0 5 10 MILES

ARED FOR THE MASS TRANSPORTATION COMMISSION

THE PLANNING SERVICES GROUP, CONSULTANTS

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to these older centers is another major traffic generator, the North Shore shopping center in Peabody.

Decentralization diminishes potential railroad commuter travel to downtown Boston. A number of towns and suburbs in this area (Saugus, Danvers, Swampscott) have traditionally been more directly dependent on Lynn or Salem for employment than downtown Boston. The short commuter trip from the suburbs of these cities is more adaptable to automotive travel than railroad travel.

A number of high income, upper level white collar communities in the outlying reaches of this sector, such as Hamilton, Wenham, Manchester and Ipswich, developed primarily because of railroad connections with Boston and still maintain this orientation. However, this area is still thinly settled "exurban" in character and, as yet, does not yield a sufficiently high density of traffic to be a major factor in railroad commuting. Moreover, past and projected future population growth here is less than in other groups of communities in other sectors of the region located at comparable distances from Boston.

North Patronage on the Reading or Western main line and the New Hampshire division main line, both of which provide commuter service from the north sector to downtown Boston, has declined about two thirds, or just a little under the average decline for the whole region. As noted previously, the Reading line is probably the most heavily patronized commuting line in the region. The large number of persons traveling on the New Hampshire division is probably due to a number of through passengers who were rerouted to this line when the Reading line became purely a commuter line in 1958. However, the patronage decline on the Reading line is not as sharp as it might appear, since 1948 passenger totals include a number interstate through passengers not now carried on this line. The major reason for decreases in railroad patronage in this sector is the construction of two limited access highways: Interstate 93 and state Route 3. Interstate 93 is a competitor of both lines while state Route 3 is competitive with a portion of the New Hampshire division line.

The Lowell and Lawrence-Haverhill metropolitan areas together form the most distant zone of the sector and are semi-independent centers with large amounts of commercial and manufacturing employment. Except for a southern tier fo suburban communities, the Merrimack Valley areas are not a major source of daily rail commuting to downtown Boston. Although these two metropolitan areas are becoming increasingly related to the Boston area,[1] commuting seems primarily restricted to the auto-oriented industries along Route 128, rather than to downtown Boston.

Melrose, Reading, Stoneham, Wakefield, Winchester and Woburn, a group of communities within Route 128 but outside the MTA-oriented core have traditionally been a good market for rail commuting. With the exception of Woburn, and possibly Stoneham, the percentage of employed persons in white collar occupations and the median family income was substantially larger than the average for metropolitan Boston in 1960. In addition, more than ten per cent of the workers in most of these communities used public transportation. Melrose, Wakefield and Reading, in particular, literally developed with the Reading line, and in past years were responsible for making the Reading line one of the most heavily patronized commuting lines in the nation (see pages 16-17). Despite the sharp, general decline in railraod commuting since the war, this line has shown some stability and is still the largest commuter line in the region. In the past decade, this group of communities showed larger absolute gains in population than any other comparable area in the region and projected absolute gains in population for the next decade are among the highest for any subsector.

Northwest The Lexington branch of the Fitchburg division provides only one commuter train per day to service this sector and railroad commuter patronage is quite small. This sector has a number of high income, white collar communities, notable Lincoln, Lexington and Concord. This part of the

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[1] Morris A. Horowitz, Commuting Patterns In Seven Standard Metropolitan Areas In Eastern Massachusetts (Prepared for the Massachusetts Division of Employment Security, 1958), p. 6.

of the region has very little retail service decentralization. Much of the labor force is probably employed in industries along Route 128. Also, this sector showed the greatest percentage growth in population in the region during the last decade. Despite some factors favoring of rail commuting, the auto-oriented decentralization of employment to Route 128 and the low prevailing densities diminish the sector's rail commuting potential.

West Patronage on the Boston and Albany main line that services this rapidly growing section of the region has experienced sharp declines (69 per cent), comparable to those occurring in the region as a whole. Needham is served by a short branch of the New Haven entering Boston via the southwest. The 19 per cent patronage decline on the New Haven's Needham branch since 1947 is not as severe a decline as occurring on many lines in the region. Because the communities to the west of Boston lie in the path of major inter-regional travel to New York City and western Massachusetts, they have traditionally had good rail and highway connections. As early as the 1930's the state constructed the Worcester Turnpike, a partially limited-access road of advanced design for its day that replaced the Boston and Worcester interurban railway. Since World War II, the Massachusetts Turnpike (Interstate 90), a major limited access inter-regional toll road, was constructed as far as Route 128 in Weston. Mainly because of high quality transportation connections, continuous urban development extends a greater distance to the west of Boston than in any other direction. Indeed, Framingham is farther from downtown Boston than any other suburb in the Boston standard metropolitan statistical area.

Although the western suburbs have lacked a complete limited-access road connection all the way to downtown Boston, a steep decline in railroad patronage occurred on the Boston and Albany railroad line which serves this sector. One reason is that the Worcester Turnpike and a number of other secondary roads accommodate automobile traffic traveling to Boston.

Another major reason is the considerable amount of decentralization of commerce and industry in this sector. A well-established retail service center exists in Waltham and one of the first major auto-oriented subregional shopping centers in the nation was established at Framingham. More important, the western sector has been the scene of much of the industrial park development that has been brought about by the construction of Route 128.

Despite highway construction and recent decentralization within the western sector, there are a number of high income, white collar communities outside Route 128 such as Wellesley, Needham and Natick, that are stronly oriented to downtown Boston. Anywhere from nine to 15 per cent of the workers in these communities use public transportation, indicating a fairly strong rail commuter orientation. These communities have high proportions of white collar workers and median family incomes considerably above the average for metropolitan Boston. However, the potential for railroad commuting in this subarea of the region is likely to be seriously reduced by completion of the Massachusetts Turnpike all the way to downtown Boston and the concurrent reduction service on the Boston and Albany line.

Southwest The New Haven's Boston and Providence main line and the Dedham, Stoughton and Blackstone branches serve this sector. With the exception of the Dedham branch, patronage declines on these lines have been substantially below the regional average. Patronage actually increased on the Stoughton branch due to diversion of passengers who once traveled on the Old Colony system. The lack of a limited access expressway in the southwest sector has been the principal reason for the relatively better performance of rail lines serving the area.

Although there is a well-established subregional shopping district in Norwood and some minor concentrations of retail services and industry along Route 128 in Dedham, on the whole, decentralization has not proceeded as rapidly in this sector as in other parts of the region. This, coupled with the fact that the southwest was one of the most rapidly growing sectors in the last decade and is expected to be the fastest growing sector in the

next decade, would appear to increase the potential market for rail transportation. In addition, Dedham and Norwood, Westwood, Dover and Sherborn are relatively high income, white collar communities with a good deal of commuting to Boston by public transportation. Low prevailing densities in the areas beyond Westwood, however, has limited the number of railroad commuters. Moreover, construction of the Southwest Expressway would probably reduce railroad commuting in this sector.

South and Southeast There is no rail commuter passenger service in this portion of the region due to discontinuance of service on the Old Colony line in 1960. In 1947, as many as 25,000 rail commuters used the Old Colony line and even as late as 1957 over 10,000 rail commuters traveled to Boston daily. After 1957, however, patronage declined sharply. Several factors have been responsible for passenger declines and ultimate abandonment of rail passenger service. First, highway connections with downtown Boston are excellent. The Southeast Expressway is the only limited access facility in the region that provides uninterruped connection from the suburbs to downtown Boston. The Fall River Expressway (State Route 24) also provides such connection, indirectly, via Route 128. Second, there has been a good deal of decentralization of retail trade and industry within this subregion. Quincy and Brockton both have well-established business districts and are centers of employment and trade for a group of nearby suburban communities. In addition, a new subregional shopping center has been established in Braintree which is geared to auto access.

Despite the existence of unfavorable factors that do not augur well for railroad commuting, there are a number of factors that would indicate some sort of rail commuting may be necessary for these two sectors of the region. First, with a satellite city, such as Quincy, located close to the center of Boston, contact between the two cities is more frequent that is the case with more distant satellite cities to the north of Boston[1]. Second, automobile

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[1] Report on Improved Transportation Facilities in the Boston Metropolitan District, Division of Metropolitan Planning (December, 1926), p. 12.

traffic on the Southeast Expressway during rush hours already taxes the capacity and efficiency of the facility. Third, the decentralized concentrations of employment are primarily in the older industries: in soft goods in Brockton, which are on the decline; or in shipbuilding in Quincy, which has consideralbe fluctuations in employment. Compared to other parts of the region, these two sectors have not felt the full impact of the decentralization of industry.

The sector's lack of substantial industrial expansion coupled with large increases in population over the past ten years indicates that portions of these sectors are becoming increasingly oriented to Boston. Indeed, the Brockton metropolitan area is becoming more suburban in its relation with Boston. In 1958, for example, Brockton had a larger number of workers commuting to Boston metropolitan area than any other city outside Boston's metropolitan limits.[1] In addition, a number of communities southeast of Quincy, have been added to the Boston metropolitan area since 1950[2], indicating closer suburban relation with Boston. The high percentage of persons employed in white collar occupations and the median family incomes in the inner portions of the sector may indicate a potential market for rail commuting.

Summary

1. The highway construction timetable is the most important factor influencing railroad commuter patronage in various portions of the region. Declines in patronage have generally been greater in the north, west and south compared to the southwest because major elements of the highway system have been completed in these areas.

2. Decentralization of industry and retail services have important effects on the amount of railroad commuting to downtown Boston. Decentralization has occurred to greater extent in the northeast, north and western sectors of the region than in the northwest, southwest, south and southeast.

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[1] Horowitz, op. cit., p. 6.

[2] Hanover, Norwell, Scituate, Marshfield, Pembroke and Duxbury

3. Almost all the sectors of the region have a number of high income, white collar communities in which the commuting habit has been retained. This is particularly the case in the northern sector within Route 128 but outside the MTA district and in the western sector outside Route 128. Although there has been no commuter service in the southern sector near Quincy and Braintree for the past two years, the former passenger volume on the Old Colony line would appear to indicate that the changes for reviving the commuter habit in this region are good.

Railroad financial trends do not reveal a clear or simple pattern, and accordingly this section begins with a brief examination of long-term trends before proceeding to an analysis of the critical trends of the last ten years.

Long-term Trends Long-term trends in operating expenses and revenues for Boston, New England and the nation as a whole follow an erratic pattern. Operating revenues and expenses declined drastically during the depression years of the thirties after having reached a peak in 1929. In the late 1930's both operating revenues and expenses began to rise, and after some acceleration during World War II reached a thirty year peak in 1947, two years after the end of the war. Thereafter, trends drifted downward, although there have been several peaks and troughs in the past 15 years.

Although operating revenues of the nation's railroads are somewhat higher than they were thirty years ago, increases have not kept pace with the nation's gains in gross national product. In view of the many freight rate increases since the war, the rise in operating revenues appears particularly sluggish.[1] This rise in operating revenues is an indication of the railroad industry's failure to secure a proportional share of the fast-growing transportation market. The situation is aggravated for Boston and New England railroads because, contrary to national trends, operating revenues are lower than they were in 1929.

More important to the railroads' financial structure is the relationship between operating expenses and operating revenues. As Table 13 shows, operating expenses as a percentage of operating revenues have been increasing for railroads in the nation, the Eastern District and Boston over the last thirty years. A general rise in the cost of equipment and materials over and

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[1] "A Railroad Policy for New England," op. cit., p. 36.

above higher labor costs in wages has resulted in substantial increases in operating expenses. As a result, the net operating income of the railroads has declined, leading to lower earnings for some, and to losses for others including the New Haven and the Boston and Maine. It should be pointed out, however, that the above relationship does not take into account fixed charges.

TABLE 13

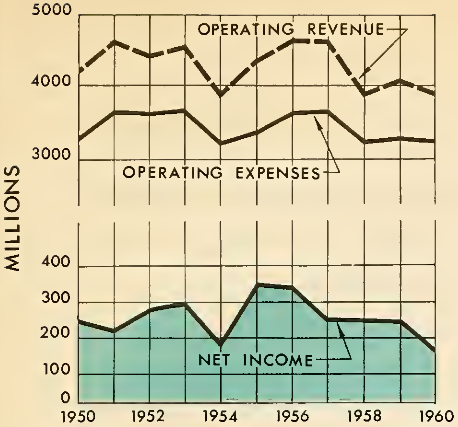
OPERATING RATIOS OF RAILROADS: BOSTON, EASTERN DISTRICT AND THE NATION, 1929, 1950, and 1959.

	1929	1950	1959
United States	71.8	74.5	79.5
Eastern District	---	79.4	83.5
Boston and Maine	75.7	77.7	79.2
New Haven	66.1	76.3	80.3

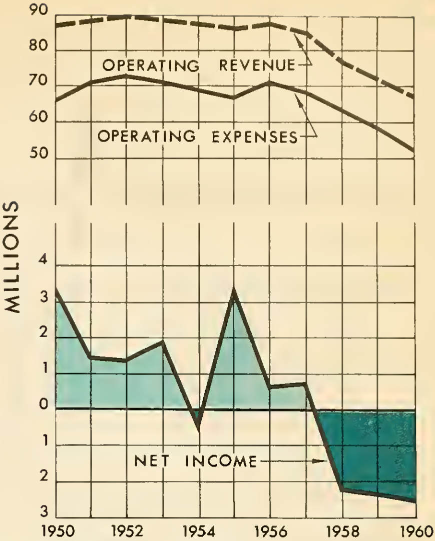
Source: Interstate Commerce Commission, Statistics of Railways in the United States, 1929, and Transport Statistics in the United States (Bureau of Transport Economic and Statistics, 1960)

Short-term Trends Figure 12 shows trends in operating revenues, expenses and net income during the last ten years for railroads in the Boston region and the Eastern District. Operating revenue and expenses for Boston and the Eastern District show a remarkably similar pattern. Both rise to a peak in 1952-1953 and again in 1956-1957, but experiences a sharp decline during the recession of 1954 and an even more severe decline during the recession of 1958.

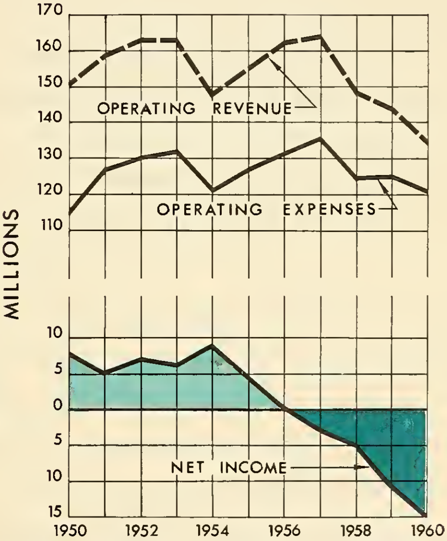
The railroad industry is extremely responsive to general economic conditions. Declines in business activity quickly induce declines in traffic which result in rapid decreases in operating expenses and revenue. The most recent railroad decline, starting in 1958, is particularly significant



EASTERN DISTRICT



BOSTON & MAINE RAILROAD



NEW YORK, NEW HAVEN & HARTFORD RAILROAD

FISCAL TRENDS, EASTERN UNITED STATES
NEW HAVEN AND BOSTON & MAINE RAILROADS

SOURCE: ANNUAL REPORT AND YEARBOOK OF RAILROAD INFORMATION, 1961

because of its persistence; it has not been followed by recovery as characteristic of previous declines.

The railroads' financial picture is clouded by the fact that operating revenues are declining at a faster rate than operating expenses. Thus, operating expenses are absorbing an increasingly larger share of operating revenues. Although this pattern occurs both in the Eastern District and Boston, it appears to be especially serious with respect to Boston region railroads. Examining Table 13 again, it will be noted that, except for the New Haven, operating ratios have shown as great an increase in the last nine years as in the previous two decades. The increase in the New Haven's operating ratio has been greater than any other railroad or area in the comparison. The serious implications of this pattern are even more apparent when trends in net income are examined. In both the Eastern District and Boston net income has been declining in the last decade. The trend, however, is much more pronounced for railroads in the Boston region which have been experiencing net losses during the last few years. The New Haven is actually in bankrupcy and the Boston and Maine is in dire financial straits.

The board of directors of the New Haven, as debtors, filed a voluntary petition for reorganization on July 7, 1961, but the railroad at that time did not have sufficient earnings to be reorganized. It not only had a large operating deficit, but was spending more money that was being taken in, and thus had to borrow money to remain operational.

Under Chapter 77 of the Bankruptcy Act the United States District Court appointed, with the approval of the Interstate Commerce Commission, trustees to run the bankrupt railroad. The trustees must operate the railroad within the restrictions laid down by law, subject to the jurisdiction of the Interstate Commerce Commission and the control of the district judge.

If the New Haven achieves an operating profit, the primary purpose of the trusteeship is the recapitalization and reorganization of the railroad. The trustees first had to stop the cash attrition and then try to put the New Haven on a net earning basis before any plan for reorganization or recapitalization could be formulated and put into effect. The principal reason for the New Haven's financial straits is that, although revenues have doubled since 1935, they have failed to keep pace with rising costs. Maintenance of way and equipment costs have also doubled since 1935, but total labor costs have increased by 133 per cent with the result that total operating costs have more than doubled.

Operating Expenses Certain components of operating expenses have *declined* in recent years despite the general postwar inflationary rise in the cost of doing business. Trends in railroad operating expenses during the last nine years in particular, merit closer analysis. Railroad operating expenses may be divided according to various functions and are in order of their importance in the total railroad cost structure: (1) providing of transportation, (2) maintenance of way, structure and equipment, (3) general administrative and overhead expenses, (4) various miscellaneous expenses (diner service, for example), and (5) traffic.

Over half the total railroad operating expense is incurred directly in providing of transportation. Although the importance of this item has increased only slightly in Boston's railroads in the last decade, expenses directly associated with providing transportation service form a significant part of railroad operating expenses. Next in importance are the costs of maintaining way, structure and equipment. Maintenance costs comprised about 40 per cent of total railroad operating expenses in 1950, but represented only about 30 per cent of all costs in 1959. The decrease in importance of maintenance costs is an interesting development, however, since costs of

maintaining fixed rail facilities must be borne regardless of fluctuations in railroad traffic. Part of the declines is probably due to abandonment and retrenchment of line and track, improved maintenance techniques and retirement of obsolete equipment. Not all the decline, however, can be attributed to reduction of facilities or the improvement of equipment. In the nine years that maintenance costs on Boston railroads declined, expenditures for maintenance increased substantially on Eastern District railroads. It is clear that some of the reduction in maintenance cost is probably due to deferred maintenance.[1]

Labor is one of the major cost elements in the railroad cost structure. While the average number of employees in the nation, Eastern District and Boston railroads was reduced from 40 to 50 per cent between 1950 and 1959 labor costs have increased because the average compensation per employee rose from 65 to 81 per cent. (See Table 14.) Wage increases have thus tended to negate any economies obtained from reduction in the railroad labor force. Boston railroads have had greater labor force reductions and wage increases than Eastern District railroads. For the Boston and Maine, reduction in employees is comparable to the nationwide reduction, but wage increases have been greater than in the nation as a whole. For the New Haven, on the other hand, the reduction in number of employees has been less than the nationwide reduction, but wage increases have been substantially greater than in the nation. In general, large wage increases for major Boston railroads have tended to counterbalance substantial cutbacks in employment during the last nine years, thwarting one of the principal methods of halting rises in operating costs.

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1. "Railroad Policy for New England," op. cit., p. 40.

TABLE 14

NUMBER OF EMPLOYEES AND AVERAGE WAGES, NATION EASTERN DISTRICT AND BOSTON, 1950-1959.

	Average Number of Employees			Average Compensation per Employee (Dollars)		
	Number 1950	1959	Percent Change	Number 1950	1959	Percen Change
UNITED STATES	1,220,401	780,971	-56.0	3,765	6,266	+66.4
EASTERN DISTRICT	493,987	295,786	-40.1	3,814	6,297	+64.5
BOSTON & MAINE	13,139	5,750	-56.2	3,596	6,153	+71.1
NEW HAVEN	21,402	11,670	-45.4	3,652	6,620	+81.2

Source: Interstate Commerce Commission, Statistics of Railways in the United States, 1929 and Transport Statistics in the United States (Bureau of Transport Economics and Statistics, 1960)

Summary Long-term declines in railroad traffic have accelerated in recent years, resulting in a decline in net earnings for the nation's railroads and in net losses for the railroads in the Boston region. Declining net income or losses, in turn, have created a number of problems including:

1. *Delayed replacement of equipment and undermaintenance.* With the advent of net losses, the outstanding effort of major railroads serving the Boston region in revitalizing their rollong stock and locomotives during the early 1950's has diminished in recent years and cannot be expected to revive. Undermaintenance of fixed rail facilities remains a continuing problem.

2. *Reduction in service.* In Boston, as elsewhere in the nation, reduction of railroad service has been particularly evident in passenger operations. A recent survey also indicates reduced service in New England railroad freight operations.[1] Although an argument can be made for some reduction of service in view of the basic economics of railroad operation, reduced freight service will not win back lost traffic to increase net earnings. Overcapacity and underutilization of the railroad plant resulting from the decline in traffic and the consequent reduction of service has tended to diminish the ability to offset high operating costs through increased volume, and has led to deferred maintenance. Moreover, the gap between utilization and capacity has probably widened in recent years because of automation and technical improvements in equipment and communications.

3. *High financing costs.* The net losses of Boston railroads added to the physical deterioration of much of the railroad plant have placed the railroads in a poor position to obtain loans in the competitive money market. As a result, interest rates on loans have risen and the railroads' financing costs have generally increased.

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[1] Arthur D. Little, Inc., Part II, *op. cit.*

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[1] Arthur D. Little, Inc., Part II, op. cit.

7. PLANS AND PROPOSALS

Introduction

Many of the basic causes of the decline of railroads apply to both the Boston region and the nation. It is useful to recapitulate them before considering proposed solutions.

(1) Regulation of railroad common carriers has not taken cognizance of the fact that railroads no longer have a monopoly of transportation service. Examples of controversial restrictions often cited are: restriction on ratemaking and passenger service abandonment; high federal excise taxes; restrictions on combination with like or unlike modes of transportation in the interests of overall efficiency; and the "fare share policy" of rate regulation, or the practice of keeping the rates of one mode of transportation high in order to insure that another mode gets its "share" of traffic. (2) Technological improvements in other modes of transportation such as motor, water, air and pipeline make these carriers effective competitors for railroad business. (3) Changes in the structure of business in regard to inventory, location and type of goods produced have reduced the demand for rail freight shipment. (4) Vast public investment in highways, airways and waterways have reduced the costs incurred by carriers utilizing these facilities, penalizing the heavily taxed, capital-starved railroads. (5) There has been great growth in the use of private and contract motor carriers employing relatively lower paid workers which compete effectively with the highly paid railroad workers. (6) In addition, some critics have attributed the decline in railroading to overly conservative railroad management.

The economic consequences of the railroad problem are almost as numerous as the ascribed causes. These include: overcapacity and

underutilization of the railroad plant; reduction in scheduled freight and passenger service; inadequate earnings and, in some cases, net losses; undermaintenance of way and equipment; higher financing costs; and higher total costs of transportation to the public.

Action by Railroad Management

Railroad management has been criticized for emphasizing the production aspects of transportation at the expense of its distribution, sales and customer activities.[1] The railroads have not undertaken vigorous market research and promotion programs of the type common in other industries. Proper allocation of costs is another troublesome problem. Allocating costs to the various functions of the joint rail facility remains a matter of difficulty and dispute. However, rail management can be more effective than it has been in the past by developing a more detailed and realistic distribution of costs for various types of traffic as well as by compiling adequate data on the character and location of past, present and future sales. In the matter of cost control, railroads have been criticized for using train miles as a measure of cost and production efficiency.[2] Although the increasingly popular practice of using long trains may achieve lower costs from a production point of view, there is a point where this practice may have unfavorable effects on traffic volume by reducing scheduled customer service in highly competitive market.

Alternate Courses of Actions

Confronted with declining traffic volumes, railroad management has generally taken four alternative courses of action to maintain net earnings:

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[1] National Transportation Policy, op. cit., p. 292.

[2] Ibid, p. 299.

1. Increase the volume of business to increase revenues above the break even point.

This approach to solving the railroad problem is the most general. It is also the most direct approach because it comes to grips with the basic technological and economic weaknesses of the railroads in relation to competing modes of transportation: their inflexibility compared to other modes in a changing, dynamic economy.

(a) Freight Containerization, a form of intermode combination, offers some promise for increasing the volume of railroad freight business. A specific railroad adaptation of containerization is piggyback, the movement of loaded or empty highway trailers on railroad flatcars.[1] The increasing popularity of piggyback service is cited as supporting evidence of the potentials of this type of service, while the railroad's inability to standardize rates and service is cited as a factor hindering its further development. Piggyback service combines the flexible, high grade service of the motor carrier with the long-haul cost advantages of the railroads in handling bulk goods. Piggyback increases labor productivity and reduces terminal costs for all freight and reduces handling costs for less-than-carload freight.[2] Since so much of the Boston railroads' business consists of terminal hauling, piggyback may have particular advantages in this region. In time, containerization on railroads may involve large scale rail movement of loaded trailers over main lines between distant points and abandonment of unprofitable or inefficient branch lines in favor of motor carrier service for pickup and delivery at main line terminals.[3]

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1. National Transportation Policy, op. cit., 652.
2. Ibid, p. 658.
3. John R. Meyer, "New England Transportation; A Fresh New Look at Our Old Railroads," The New Englander, August, 1962, pp. 14, 37.

(b) Interstate Passenger Service Railroad intercity passenger service has been declining at a faster rate than short-haul commuter rail passenger service. Partly because of this trend, some experts advocate the discontinuance of all rail intercity passenger service.[1] This may occur either by willful action on the part of railroad management or by a process of natural attrition if present trends continue. According to this point of view, it is claimed that other modes of transportation - highways and airlines - are meeting most of the needs for interstate travel and that the railroads do not present any clear service advantages in providing this type of service, nor do railroads serve any locations that are not served by air or highways. An opposite point of view asserts that railroads do have a cost advantage for long hauls compared to short hauls and that major improvements in speed and frequency of intercity service, would generate a sufficiently large demand to justify intercity rail service. In support of this argument, it is claimed that in recent years there has been a definite firmness in the medium-haul market (200 to 500 miles) and that the market for intercity rail passenger service appears to decline progressively above this range.[2]

The New York Regional Plan Association maintains that medium-haul rail passenger service would be particularly applicable along the densely populated urban northeastern seaboard or "megalopolis." It advocates 200 mile per hour automated passenger trains on improved rights of way to divert unprofitable short-haul air passengers to railroads.[3, 4] A substantial investment in right of way and equipment would be needed to achieve this standard of service, and any such investment should be preceded by a thorough cost study to ascertain its profitability.

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1. National Transportation Policy, op. cit., p. 322.
2. Ibid, pp. 309, 312.
3. "200 MPH Railroad Line Proposed for Northeast", New York Times, July 30, 1962.
4. Meyer, op. cit., p. 37.

(c) Commuter Passenger Service Although fares for railroad commuter passenger service are higher than out-of-pocket costs of the automobile commuter,[1] they are not sufficiently high to cover operating costs of the carriers. Railroad disadvantages in metropolitan mass transit are both technological and economic. The large capital investment in the railroad plant and inflexible employee work rules make railroad costs higher than other forms of urban mass transit and are responsible for a high ratio of fixed to variable costs (see page 35). Suburban railroad service does not offer either the long hauls or maximum utilization of plant necessary to reduce unit costs. While the typical length of a haul on suburban railroads is longer than in other forms of urban mass transit, it is not long enough to provide the opportunity for offsetting high fixed costs. Rail commuter service approaches capacity twenty hours of the week, but traffic declines to negligible proportions during the remaining hours of the week and the use of plant and employees is therefore relatively low.[2] (See Table 10.) Downtown rail passenger terminals are located away from major concentrations of employment. Commuter railroads therefore do not have the flexibility or coverage of other forms of mass transit in the downtown area. Rail commuters who do not relish a ten to twenty minute walk from the rail terminal to their destination must transfer to another mode of transit at additional expense.

Despite these disadvantages, commuter traffic volume in the region and the nation actually increased in the mid-1950's. This increase was in contrast to the uninterrupted decline of longer haul interstate passenger service. In light of these trends, there have been several proposals for either improving service or retaining some form of rail transit for suburban and outlying areas of the region.

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[1] This assumes at least one passenger besides the driver.
[2] National Transportation Policy, op. cit., p. 559.

An attempt to increase passenger volume through improved rail commuter service in the Boston region was attempted earlier in the 1950-1960 decade when both the Boston and Maine and New Haven railroads acquired new, more flexible Budd cars for passenger service. The resulting increase in the number of commuter passengers was not large enough to make commuter service profitable. This lack of substantial success may be partly because the innovations in Boston commuter service were not completely integrated: there was little simultaneous and systematic increase in frequency of service, and lack of skilled cost accounting tended to obscure results.

Other cities with significant volumes of suburban railroad traffic have engaged in extensive service and equipment experiments. In 1958, Philadelphia initiated its "Operation Northwest" in which the city financially aided the Reading and Pennsylvania railroads in increasing commuter rail service. Since 1960, the Chicago and North Western Railway Company has engaged in a program of simultaneously improving equipment and service and increasing fares. Although the experiments in commuter passenger service and equipment in major cities do not appear encouraging, the results of the experiments have not been conclusive. The Mass Transportation Commission's proposed demonstration program for increasing service and simultaneously reducing fares on certain Boston suburban railroads may help to clear up many unresolved questions about the future role of suburban commuter service.

There have been various suggestions for an integrated metropolitan railroad commuter system that would accommodate relatively long-distance metropolitan travel.[1, 2] These proposals are based on the

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[1] Stanley Berger, "How Commuters Can Have Their Trains," Atlantic Monthly, May, 1960.

[2] James E. Lee, "The Old Colony Transportation Problem," Traffic Quarterly, July, 1961.

assumption that rapid transit is not suitable for long-distance extension and operates best with closely spaced stops serving dense urban areas. However, the type of suburban rail service to be offered is a source of controversy. One expert argues that for the high density traffic characteristic of metropolitan travel, electrified trains would be more efficient than diesel trains.[1] In this regard, a unified and electrified super railroad transit system has been proposed to serve all of Boston's more distant suburbs (Hingham, Braintree, Canton, Needham, Framingham, Waltham, Lexington and Lynn). Such a plan would utilize a new direct rail connection between North and South Stations, eliminating the two stub-end terminals and providing greater coverage in the downtown area. Other proposals for nonelectrified types of railroad service that utilize Budd cars have been made for the Old Colony line and a group of suburban communities west of Boston.[2, 3]

2. Increase the unit price of transportation to increase revenues above the break-even point thus allowing for a slightly smaller volume of business.

This alternative has been attempted with generally negative results. Railroads are experiencing severe competition with unit prices charged for the same service by other modes of transportation. Increases in unit prices may reduce the volume of business to such an extent as to cancel out possible beneficial effects. A recent study showed that in Boston, for each one per cent increase in commuter fares above 20 per cent, the number of passengers carried decreases by 1 1/3 per cent plus

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[1] Ibid, p. 473.

[2] DeLeuw, Cather and Company, Report to the Old Colony Area Transportation Commission on Plans for Improved Suburban Transit (Brookline, April, 1959).

[3] John S. Gallagher, A Report on Rail Commutation Service between Boston and the Western Suburbs (Prepared for the Boston and Western Suburbs Transportation Council, Inc., February, 1961).

a factor of 1.6 per cent.[1] The reverse policy of reducing prices in order to increase the volume of revenue producing traffic to a level above the break-even point has also had little success, although this type of action may be effective for selected products whose weight and bulk characteristics are such that there are clear economies in railroad use. It is hard to draw any definite conclusions regarding the effectiveness of selective increases and decrease of prices because government restrictions have never allowed the full free play of market forces to operate.

3. Redesign the railroad system through technological improvements in rolling stock and fixed plant to reduce variable and fixed costs and lower the break-even point.

Technological improvements have been responsible for declines in operating expenses during the past few years. Undoubtedly much more can and should be done, but two factors tend to limit the effectiveness of this alternative. The long-term inflationary rise in prices has increased the cost of labor, materials and equipment. Low earnings(and in the case of railroads serving the Boston region, net losses) leave insufficient funds with which to make the costly technological improvements. In fact, under these conditions the problem is actually aggravated by the tendency to defer maintenance. The economies of reducing trackage may limit the long-term competitive effectiveness of railroads if not accompanied by technological improvements that increase efficienty and capacity on existing lines.

4. Discontinue the product or service.

This alternative has been advocated by railroads in regard to commuter passenger service. The underlying assumption is that any operation that consistently produces deficits should be discontinued and

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[1] Seminar Research Bureau, Problems of the Railroads (Boston College, June, 1959), p. 30.

that substantial overall reductions in operating and fixed costs can be achieved by eliminating service and retiring the fixed plant associated with unprofitable operations. It is felt that such action will contribute to improved earnings by allowing profit-earning operations such as freight service to play a more significant role in the railroad's total operation. Operations that produce consistent deficits are those which are best performed by competing modes of transportation. It is claimed that these operations were unprofitable for railroads even in the earlier part of the century when railroad passenger service was at its height, but that deficit-producing characteristics were then obscured by the inadequate cost accounting procedures.

Opponents argue that because of the importance of the shared fixed plant it is difficult to determine through the allocation of joint costs the profit or deficit characteristics of any of the manifold railroad operations. Even if an equitable method were developed, it is not the deficit operations that are important. The costs associated with a fixed plant of high capactiy are enormous regardless of the amount and type of traffic. Therefore, any service that can provide revenues above costs will, by continuous utilization of the large potential capacity of the fixed plant, help defray the high fixed costs.

Action by Cities and States

Municipal and state corrective action has been largely confined to the area of railroad commuter service. These remedies have included tax relief, direct cash payments, loans for renovation and re-equipping, and operation by public corporations or authorities, and mass transportation planning.

Local real estate taxes comprise significant portion of the total tax bill of railroads. In Boston, the North Station passenger terminal

is exempt from taxation while the taxes paid on South Station passenger terminal amounted to about $800,000 in 1960. Although taxes on South Station are paid by the Boston Terminal Corporation, the New Haven, owning 70 per cent of the corporation's stock, incurs a major share of the tax burden. It has been recommended that legislation be enacted empowering a public authority to purchase by eminent domain the South Station terminal facilities for purposes of developing the area.[1] The authority would pay a ground rent to Boston in lieu of taxes. Although half of this ground rent would come from two railroads, the New Haven and New York Central, the New Haven would still save about $400,000 under this arrangement. In addition, the difference between the ground rent and the tax revenue as determined by assessed valuation would be made up by the state.

Because of the difficulty in allocating portions of railroad property to freight or passenger service, a definite formula exempting railroad property from real estate taxes in the Commonwealth has not been recommended.[2] Tax relief could be offered to all railroads or only to railroads experiencing net losses. The rate of reduction could vary anywhere from 25 to 100 per cent. Because the real estate tax is such an important source of revenues for the cities and towns of the state, it has been recommended that a good part of the tax relief be assumed by the state. It should be noted that tax relief has been granted to commuter railroads in other areas, notably to the Long Island Railroad in 1954, through the New York State Redevelopment Law.

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1. Special Report of the Mass Transportation Commission Relative to the the Discontinuation or Curtailment of Service by Railroads, The Control and Maintenance of Grade Crossings and Other Related Matters, House No. 3110, Commonwealth of Massachusetts, February, 1961, p. 26.
2. Ibid, p. 28.

Direct payments is another alternative used to provide relief for commuter railroads. In the Boston region, the New Haven railroad was granted $900,000 in order to continue operation of the Old Colony line for one year beginning July, 1958. The state paid the money from assessments levied against the southeastern suburbs served by the line. At the end of the first year service stopped and still has not been resumed. Philadelphia, in order to initiate its experiment, "Operation Northwest," paid $160,000 to Pennsylvania and Reading railroads for a six month period in 1958. New Jersey in 1960 provided cash payments to railroads serving northeastern New Jersey, Newark and New York City according to their participation in commuter traffic.

Public organizations have dealt with the rail commuter problem in a number of cities. Although transportation districts have been proposed to run commuter rail service from points west and southeast of Boston, this method has so far had little direct application in the Boston region. Improvement and rehabilitation of the Long Island railroad in 1954 was accomplished through a redevelopment corporation. In 1960, Philadelphia established a nonprofit corporation to take over the operation of the Pennsylvania and Reading's commuter lines within the city. The corporation rendered this service at yearly contractual rate, receiving payments from the city.

There have been other minor recommendations for rendering aid to Boston's commuter railroads. At present, railroads are responsible for maintaining many highway bridges over the railroad right of way. It has been recommended that the state take title to these bridges and assume the maintenance costs. Railroads also bear the costs of maintaining grade crossings for the convenience of the general public and it has been recommended that the state assume this burden.

Action by the Federal Government

The Interstate Commerce Commission (ICC) regulates railroad fares and service and operates a loan guarantee program through federal taxation. Because of the delay and negative attitudes of some state regulatory commissions, the Transportation Act of 1958 speeded up the procedure a railroad must go through to discontinue trains. This measure forced the state and local communities to take action to retain service. The act has been criticized on the grounds that (1) The ICC has had insufficient time to act on discontinuance, (2) the burden of proof has shifted from the carrier to the public and (3) the measure allegedly allows the railroads to determine the extent to which they will serve the public. Now that the cities and states have begun to take corrective action it is recognized that the discontinuance provisions may have detrimental effects. The ICC now favors lengthening the period for action on discontinuances and shifting the burden of proof on the carriers.

The guaranty loan program in the 1958 Transportation Act has not been used by the railroads apparently because railroad management does not appear to be anxious to assume new debt and interest payments. It has been suggested instead that the ICC should implement a long term, low interest loan program and that cooperation be obtained from railroad management in adding new equipment instead of discontinuing service.[1] The only federal measure that has actually been enacted is the reduction of the ten per cent federal excise tax on transportation, effective October 1, 1962. However, it should be noted that local taxes on terminals are widely regarded as the most disproportionate tax burden for most commuter railroads.

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[1] National Transportation Policy, op. cit., p. 576.

Mergers

Merger means the unification of properties under a single corporate management, and operation and management as a single unit.[1] There have been two major assumptions underlying the argument in favor of railroad mergers. One is that mergers, by eliminating duplicating facilities and overlapping services and affording other economies, contribute significantly to a more efficient railway system. A second assumption is that a merger of railroads serving the same territory into a balanced railroad system, strengthens the financial position of the railroad system as a whole. It is claimed that merging the approximately 500 operating railroads of the United States into a relatively small number of systems would facilitate regulation, reduce costs, improve service capability and facilitate mobilization in event of war.

Opposition to mergers has developed at many levels: organized labor fears the loss of jobs; special interest groups in various communities fear that inequities might arise from reliance on one railroad carrier; some smaller railroads feel that they might be harmed by mergers.

A number of plans for consolidation on affecting railroads serving the Boston region have been proposed. Two alternative plans for consolidation have been widely discussed: (1) consolidation of Boston and other New England railroads into a single terminal system; (2) competitive combination of regional railroads with trunk lines serving the Midwest. In addition, current trends may make possible the consolidation of all railroads serving the Boston region

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[1] National Transportation Policy, op. cit., p. 229.

with a single large trunk system spanning the Eastern District.

Northern New England Railroads The north-south lines that operate entirely in the three northern New England states (Maine Central, Bangor and Aroostook, Rutland) are not essential factors in these alternative consolidation plans. The northern railroads serve a raw material based territory rather than a manufacturing area and are originating railroads with relatively long hauls. Because of these characteristics, these railroads have traditionally been stronger financially than the railroads that operate primarily in the three southern New England states, Connecticut, Massachusetts and Rhode Island. If the northern New England railroads were to merge with railroads serving the Boston area, the region's railroads would certainly gain in strength, but this type of combination does not appear essential to the railroads concerned.

The effects of mergers on northern New England railroads, however is actually more complex than the above discussion appears to indicate. The Boston and Maine does not operate exclusively in southern New England. Its north-south lines extend into northern New England and are important to northern New England railroads as connectors to the Boston region. The Boston and Maine does, therefore, maintain a strong economic inter-relationship with, and interest in, northern New England railroads. For example, in 1954 more than half of the Maine Central's interchange traffic was with the Boston and Maine at Portland.[1] Thus, proposals for consolidation of the Boston and Maine, Maine Central, Bangor and Aroostook, and Rutland have been based on strong economic inter-relationships among the roads.

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[1] "Railroad Policy for New England," op. cit., p. 32.

The northern New England roads also have an indirect interest in consolidation that occurs in the Boston region. The volume of freight traffic on the Boston Maine and New England railroads has been aided because these railroads use Canadian trunk lines that have a westbound rate differential advantage over American trunk lines serving the Middle West. The northern New England railroads fear that if the Boston and Maine and New Haven were to merge, the validity of the differential rates would be questioned and overruled by the ICC [1] The New Haven, makes little use of the Canadian differential routes and might benefit if traffic were diverted to American trunk line routes.

New England Terminal Railroad One plan of consolidation advocates combining all three railroads serving the Boston region into one terminal railroad system. As explained previously (see page 40), per diem charges on freight cars belonging to other systems are a significant expense item in the Boston railroads' budget. For example, the Boston and Maine is estimated to pay an average of $7 million annually in per diem charges. [2] Elimination of a substantial portion of these per diem charges might be achieved through consolidation into a single, merged, terminal railroad system.

Terminal or switching railroads in other parts of the nation, notably the Belt Railway Company of Chicago and the Terminal Railroad of St. Louis, are granted two days per diem charges free as a consequence of their terminal operation. However, unlike the proposed New England terminal railroad, these railroads are small, operating almost entirely within a single metropolitan area. The Terminal Railroad of St. Louis has only 400 miles of track and operates primarily in St. Louis and

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1. Ibid, p. 54.

2. "Benson Calls New Haven Hostile to Merger Talks," The Boston Globe, July 30, 1962.

East St. Louis, connecting all lines that enter the city. The Belt Railway of Chicago is owned jointly by thirteen trunk line railroads and circles through a dense urban area only about seven miles from the center of Chicago. The main function of these two railroads is to switch cars among various trunk lines and customers. In both cases, the trunk line railroads absorb part of the per diem charges in return for the costly services provided by the terminal railroads.

A New England terminal system, with Boston at the center, would apply for the same kind of per diem relief. Furthermore, by performing only switching or terminal operations for other railroads, the New England terminal system could reduce its ownership of freight cars and thereby cut operating expenses associated with freight equipment. Per diem relief can be obtained only by approval of the Association of American Railroads, a national organization of interchanging freight railroads. Securing approval for a large terminal railroad covering all of Southern New England may involve some problems. The consolidated terminal railroad would set a precedent by being the largest railroad to receive such relief and there is no assurance that other railroads in the association might not object to allowing per diem relief for such a large system.

In addition, the monopoly status of a consolidated terminal railroad presents further problems. Although competition among various railroads serving urban centers is often a desirable policy, a regional monopoly in New England is claimed to be justified on the grounds that there is insufficient rail traffic to support healthy competition. It is claimed that competition among different modes of transportation would prevent inequities to shippers that might arise from a unified rail service. A regional railroad, of course, would connect and interchange with a number of trunk line railroads outside

the system at different points or gateways. Some guarantee of traditional gateway interchanges of traffic might be necessary if such a merger is approved.

The connecting trunk line railroads would compete with each other for traffic going and coming in the New England terminal area. Currently, some $600 million worth of freight originates in the New England area. This volume might give the unified New England system considerable leverage in bargaining with the interchanging railroads.[1] At the national level, it has been recommended that such a unified system should not only be operated as a single entity, but should be equally and jointly owned by the railroads with which it connects.[2] However, New England interest groups are likely to oppose "outside" control of a regional system as not promoting the best economic interests of the region.

In favor of the merger, a terminal railroad consolidation would lead to savings through the abandonment of many circuitous and duplicating routes. For example, the Boston and Maine's more direct and efficient Hoosac tunnel route may be favored over the roundabout, expensive New York Central route west of Springfield. More efficient switching operations could result at many points that today are served by two or more railroads: Fitchburg, Lowell, Framingham, Worcester and Springfield. Centralized business promotion and centralized control of traffic would result in substantial savings if a regional consolidation could be effected.

Although such a terminal railroad may be more efficient than

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1. _Loc. cit._

2. _Loc. cit._

terminal operations now performed in Boston, the region would be permanently committed to the many disadvantages of a terminal operation. Opponents of the consolidated terminal plan suggest that few financial advantages would accrue from combining railroads which, because of low earning ability, already have little capital to spend on modernization of plant.[1] These critics claim that many of the economies of consolidation could be achieved by closer cooperation among Boston railroads.[2] Futhermore, they suggest that such a merger would only combine roads with similar weaknesses. In addition, some early critics doubted whether such a merger would benefit New England ports. The New Haven would tend to use its more extensive facilities in the port of New York rather than its smaller facilities in the port of Boston, and the natural desire of railroads to obtain long-haul freight would favor an all-rail route to New York over a combined system.[3]

Competitive Trunk Line Mergers Another proposed plan of consolidation for the Boston region is based upon the principle of maintaining competition. Each of the Boston railroads would combine with a stronger trunk line railroad serving the Midwest thereby resulting in combined systems offering through routes from the Boston region to the Midwest. Proponents of this alternative claim that the expensive terminal operations of the Boston railroads would be more than offset by profitable operations of strong trunk line railroads. They suggest that regional industries would gain from vigorous competition between the two systems and

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[1] "A Railroad Policy for New England," op. cit., p. 55.
[2] Loc. cit.
[3] Loc. cit.

some duplication and waste would be eliminated.

The railroads serving New England, New York and New Jersey do not exhibit the economic strengths of the long-haul trunk line railroads serving the western portion of Eastern District: the Norfolk and Western, the Chesapeake and Ohio, the Nickel Plate, the portion of the New York Central west of Buffalo, the western segment of the Pennsylvania and the Baltimore and Ohio.

There are also smaller trunk lines outside New England that make important interchanges of traffic with New England railroads: the Delaware and Hudson with the Boston and Maine; the New York, Ontario and Western, Lehigh and Hudson, Lehigh and New England with the New Haven.[1] There have been various proposals to merge large trunk line systems and smaller interchanging railroads with New England railroads according to their traffic orientation.[2]

Some of the more important merger proposals merit further discussion. One proposal is to combine the Boston and Maine with the Delaware and Hudson and the Erie and Lackawanna to provide an improved unified rail system extending from New England seaports to the Middle West. Opponents of this proposal claim that the merger will result in a natural orientation to the Port of New York to the detriment of the Port of Boston, since the Erie and Lackawanna have important termini in the New York area.[3] Another proposal to combine the Boston and Maine with the New York Central would result in the shortest and lowest grade rail line from Chicago to Boston and the abandonment of the less

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1. "A Railroad Policy For New England," p. 33.
2. *Ibid,* p. 50.
3. *Ibid,* p. 55.

efficient and duplicating Boston and Albany Division west of Springfield.[1] If any of the above Boston and Maine trunk line mergers should occur, then the New Haven would also be forced to join a trunk line system. In this regard, the most frequently mentioned merger has been between the New Haven and Pennsylvania railroads.[2] In any case, if Boston and Maine-New York Central and New Haven-Pennsylvania mergers should occur, such points as Boston, Framingham, Lowell and Fitchburg would be served by two railroads that also serve the entire area east of the Mississippi and south to Virginia.[3]

Current Developments At present, merger proposals would result in four principal Eastern railroad systems. Three of these systems would be "competitively balanced" and would be built around the following nuclei: (1) the Chesapeake and Ohio-Baltimore and Ohio; (2) the Norfolk and Western-Nickle Plate (which also might include the Erie and Lackawanna and the Delaware and Hudson); (3) the Pennsylvania-New York Central. The fourth system would include a group of New England rail carriers: the New Haven, Boston and Maine, Maine Central, Boston and Albany and Bangor and Aroostook.

The principal factor preventing implementation of any consolidation of Boston railroads with larger systems farther west, is the reluctance of any financially strong railroad to accept the weak New England railroads in a merger. The New Haven is already in

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[1] Herbert E. Bixler, "Boston and the Railroad Merger Question," Greater Boston Business, August 1961.

[2] "A Railroad Policy for New England," op. cit., p. 57.

[3] Bixler, loc. cit.

bankruptcy, Boston and Maine is experiencing serious net losses, and it has been indicated that the Boston and Albany Division of the New York Central is not a profitable operation. Hearings have been initated on a proposed merger of the New York Central with the Pennsylvania Railroad, neither of which are anxious to include the Boston railroads in the consolidation. If such a merger is approved, joining regional railroads to form the proposed consolidated through routes as outlined above would be impossible. The Boston railroads' strength would be improved considerably by a merger with the combined New York Central-Pennsylvania system, but it clearly seems to be in the region's interest that both the New Haven and the Boston and Maine be included if such a combination occurs. If only one of the two major Boston railroads were included, it would probably result in the demise of the excluded railroad. If a merger of Boston railroads with a larger system does not occur, then the Boston railroads face the prospect of continuing as weak regional railroads. In this event, a consolidated Boston or New England terminal railroad system would remain as an alternative.

Summary At the national level, general plans of consolidation have been formulated on three different principles:

(1) Plans favoring the principle of competition between all major points within each region were developed by Professor Ripley under the impetus of the Transportation Act of 1920. The plan originally proposed 19 national consolidated systems with four to five trunk line systems in the Northeast. With the advent of the depression and increased competition from other modes of transportation, however, the plan was modified to include not more than seven national systems or two systems in each major region.

(2) Plans advocating a unified regional railroad with a minimum of competition within each region were favored by the National Transportation Committee in 1933 and were based on the Prince plan formulated in the same year. This plan proposed seven large regional systems, two in the east, two in the south and three in the west. Competition would be confined to a minimum number of through routes serving the most important traffic centers and competition would be eliminated at intermediate points within respective regions. The principal objection to this plan was that cities at the border lines of regional systems would be served by as many as four railroads while important traffic centers in the heart of various regions would be served by only one or two systems.

(3) A third plan, advocated by ICC Commissioner Miller in 1938, embodied the principle of a single railroad system serving the entire nation. It was claimed the savings would be greater and the problem of assigning various carrier to different systems could be avoided.

The entire question of merger is surrounded by controversy. The four-year protection of labor and the studies required to reorganize lines, terminals and communications systems in order to reap the benefits from consolidations are both expensive and time-consuming for railroad

management and add to railroad risk and uncertainty in a changing economy.[1] Consolidation might afford economies on main through routes at the expense of points off the main line.[2] Other experts claim that certain railroads have already reached large scale economics because of size.[3] For example, substantial economies of size have already been achieved in the largest eastern railroads and more recently on railroads in the west and south. The New York Central and the Pennsylvania are already the nation's largest railroads and still are among the low-earning railroads in the nation.[4.] Although the low profits of large railroads might be due to high terminal costs in dense areas or excess capacity arising from diversion of traffic, economic literature on the savings inherent in large systems is complicated and inconclusive and reveals little about the possibilities of low unit costs from larger railroads.[5]

Other obstacles to mergers have been evident over the last decade. One of the main obstacles has been lack of adequate incentive.[6] In most industries, merger is usually a result of economic expansion rather than

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[1] National Transportation Policy, op. cit. p. 261.

[2.] Loc. cit.

[3.] James C. Nelson, Railroad Transportation and Public Policy, Washington, D.C.: (Brookings Institution, 1959), p. 183.

[4.] Loc. cit.

[5.] Ibid, p. 182

[6.] National Transportation Policy, op. cit., p. 257.

decline. For at least 30 years railroads have not been a growing industry. In many cases they have found it difficult to secure the capital investment necessary to achieve the extensive economies and services advantages that consolidation may afford. In addition to the uncertainties that have already been discussed, there is the risk for stronger railroads who fear the consequences of railroads in a weaker financial position. In view of these uncertainties, it is surprising that none of the acts dealing with railroad consolidation have ever offered inducements in the form of government loans to help carriers obtain capital to revamp consolidated systems.

In general, legislative acts dealing with railroad consolidation have been ill-timed and poorly conceived.[1] The criteria set forth in the consolidation act of 1920 hindered rather than abetted the formulation of consolidation plans.[2] Particularly important criteria in this regard were standards based on preservation of competition and maintenance of existing routes and channels of trade.

Congress designated the ICC, an operating regulatory agency rather than an administrative planning agency, to implement a detailed merger plan. The plan took nine years to develop and was not completed until the onset of the depression removed all short-term prospects for merger. A new act in 1940 added more criteria, relieved the government of responsibility of for initiating action and left initiative entirely to the railroad industry. Furthermore, action on consolidation was cut short by the beginning of World War II.[3]

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[1] *Ibid.*, pp. 250-252.

[2] *Ibid* p. 251.

[3] *Loc. cit.*

There have been other obstacles to consolidation that still remain today. Organized labor, fearing the loss of jobs, has generally opposed consolidation. The complex structure of railroad debt and bond holdings has made merger action complex and slow. Some local special interest groups and communities also opposed mergers because competition among carriers would be reduced.

APPENDIX - - SOURCES OF DATA

1. Baker, George Pierce, The Formation of the New England Railroad Systems (Cambridge: Harvard University Press, 1949) surveys railroad combination in New England in the nineteenth century, and was extremely valuable in tracing the evolution of the three regional rail systems for the historical section of this report.

2. Kirkland, Edward Chase, Men, Cities and Transportation (2 vols., Cambridge: Harvard University Press, 1948) provides a comprehensive history of all aspects of railroad transportation in New England and was used extensively in the interpretative aspects of the historical chapter.

3. Whitehill, Walter Muir, Boston - A Topographical History (Cambridge: Harvard University Press, 1959) was particularly valuable for tracing early railroad developments as they affected the central city of Boston

4. National Transportation Policy, Preliminary Draft of a Report prepared for the Committee on Interstate and Foreign Commerce, United States Senate, by the Special Study Group on Transportation Policies in the United States (Washington D. C.: Government Printing Office, January, 1961) is one of most comprehensive analyses of all aspects of the railroad problem, especially in relationship to competing modes of transportation. This study was used extensively throughout this report, but was particularly useful in giving insight into developments, plans and proposals of other areas as presented in the final portion of this report.

5. Barriger, John, Super Railroads for a Dynamic American Economy (New York: Simmons, Boardman Co., 1956), a survey of present railroad problems with emphasis on the future role of railroads in the national economy, was extremely useful in the technological aspects of this report.

6. Nelson, James C. Railroad Transportation and Public Policy(Washington, D. C. : Brookings Institution, 1959) is an excellent general survey of the railroad problem and was used for general background throughout this report.

7. Martin L. Lindahl, "A Railroad Policy for New England," in Public Transportation for New England (Interim Report No. 7, March, 1957, New England Governors' Committee on Transportation is a most thorough analysis of regional railroad problems and was used throughout this report, especially in the freight and financial sections.

8. Seminar Research Bureau, Problems of Boston Railroads (Boston College, June, 1959) presents a good general statement of Boston's commuter railroad problem as well as a concrete study of effects of passenger fare increases on patronage, this study proved in passenger section of this report.

9. Seminar Research Bureau, Studies of Urban Transportation; Travel in the Boston Region 1959-1980, An Evaluation of Transportation Needs (Vol. III, Boston College, April, 1961) presents a comprehensive analysis of present and future trends in downtown commuter travel by sector and was especially valuable for the passenger sector analysis of this report.

10. Gottman, Jean, Megalopolis; The Urbanized Northeastern Seaboard of the United States (New York: The Twentieth Century Fund, 1961) is an excellent general regional study that was useful for background information, especially in the analysis of intercity passenger movement.

11. Horowitz, Morris A., Commuting Patterns in Seven Standard Metropolitan Areas in Eastern Massachusetts (Boston Division of Employment Security of the Commonwealth of Massachusetts, 1958) presents data on commuting patterns to seven SMA's from adjacent communities and commuting patterns between SMA's. The study was valuable for analysis of railroad passenger commuting patterns in outlying portions of the region.

12. Chinitz, Benjamin, Freight and the Metropolis: The Impact of America's Transport Revolution on the New York Region (Cambridge: Harvard University Press, 1960) is a general analysis of trends in movement of goods within a metropolitan area that has applications for the Boston region.

13. Little, Arthur D., Inc., The New England Freight Market; A Preliminary Report to the New England Railroad Presidents' Conference (3 vols. Cambridge: December, 1959). Part I proved valuable for its analysis of the relationship between rail carload volume and New England economic activity. Part II provided valuable survey information on the competitive and marketing aspects of the railroad freight problem. Part III presents the study's findings and recommendations. The entire study was used extensively for background information for the freight section of this report.

14. *Special Report of the Mass Transportation Commission Relative to the Discontinuation of Curtailment of Service by Railroads, the Control and Maintenance of Grade Crossings and other Related Matters* (Commonwealth of Massachusetts, House No. 3110, February, 1961) concentrates on the problems of the New Haven railroad, but proved particularly useful in this report for its discussion of various forms of relief for railroads.

15. *The Annual Reports* of the *Boston and Maine* and *The New York, New Haven and Hartford* railroads provided valuable information on operational and technological developments as well as useful financial data.

16. Interstate Commerce Commission, *Transport Statistics of the United States* (Washington, D. C. : Bureau of Transport Economics and Statistics) provides detailed financial and operational statistics on all aspects of individual Class I railroads from 1950 to 1960, while the same agency's *Statistics of Railways in the United States* provides a somewhat comparable yearly compendium of data for several decades prior to 1954. Both series were invaluable for all phases of this report and were entensively used in compiling charts and tables.

17. Gottfield, Gunther, M. *Rapid Transit Systems in Six Metropolitan Areas* (Washington, D. C. : Staff Report, Joint Committee on Washington Metropolitan Problems, 1959) provides statistical data and descriptions of major railroad commuter systems and was used for comparative purposes in the passenger section of this report.

18. American Municipal Association, *The Collapse of Commuter Service, A Survey of Mass Transportation in Five Selected Cities,* (Washington, D. C. : 1959) provided useful equipment and track data on major Commuter railroads and was used for comparative purposes in the passenger section of this report.

19. Eastern Railroad Presidents Conference, Exhibit to Eastern Railroad Problems; The Serious Situation and Its Causes, (Jersey City: October, 1961) and Yearbook of Railroad Information (yearly) are useful statistical sources traffic trends, equipment and finances data. The former gives data for individual major eastern railroads, while the latter gives national and Eastern District trends.

20. The Accounting Departments of the New York, New Haven and Hartford and Boston and Maine Railroads provided valuable unpublished equipment and passenger data. Especially useful was a letter to the Mass Transportation Commission from the New Haven railroad dated November 14, 1961.

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